BASELINE RISK ASSESSMENT REPORT

Jones Road Groundwater Plume
Federal Superfund Site (SUP075)
Harris County, Texas

Shaw Project No. 129389

Prepared for:

Texas Commission on
Environmental Quality
State Lead Section
Remediation Division
12100 Park 35 Circle
Austin, Texas 78753

Prepared by:

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3010 Briarpark Dr., Suite 400
Houston, Texas 77042

August 29, 2008

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Acronyms

ARAR	applicable or relevant and appropriate requirements
ATSDR	Agency for Toxic Substances and Disease Registry
bgs	below ground surface
BLRA	baseline risk assessment
cis-1, 2-DCE	cis-1, 2-dichloroethylene
Cal-EPA	California Environmental Protection Agency
CDI	chronic daily intake
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COC	chemical of concern
COPCs	chemicals of potential concern
CSM	conceptual site model
CTE	central tendency exposures
DHHS	Department of Health and Human Services
DNAPL	dense non-aqueous phase liquid
DPT	direct push technology
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
HI	hazard index
HQ	hazard quotient
IRIS	Integrated Risk Information System
IARC	International Agency for Research on Cancer
IUR	inhalation unit risk
LOAEL	lowest-observed-adverse-effect level
µg	microgram
µg/kg	microgram per kilogram
µg/L	microgram per liter
$\mu g/m^3$	micrograms per cubic meter
m^3/day	cubic meter per day
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
mg/kg-day	milligram per kilogram per day
MSSL	medium-specific screening levels
NCEA	National Center for Environmental Assessment
NCP	National Contingency Plan
NOAEL	no-observed-adverse-effect level

NTP	National Toxicology Program
OSWER	Office of Solid Waste and Emergency Response
PCE	perchloroethylene
PCL	protective concentration level
POTW	publicly-owned treatment works
RAGS	Risk Assessment Guidance for Superfund
RfCs	reference concentrations
RfDs	reference doses
RfDo	oral reference doses
RI	remedial investigation
RME	Reasonable maximum exposure
SDWA	Safe Drinking Water Act
SF	slope factors
SLS	State Lead Section
TAC	Texas Administrative Code
TCE	trichloroethylene
TCEQ	Texas Commission on Environmental Quality
TLDR	Texas Department of Licensing and Regulation
trans-1,2-DCE	trans-1,2-dichloroethylene
TRRP	Texas Risk Reduction Program
UCL	upper confidence limit
VC	vinyl chloride
VOC	volatile organic chemicals

1.0 Introduction

1.1 Objectives

Following are the objectives of this Baseline Risk Assessment (BRA) for the Jones Road Superfund site:

- Estimate the potential health risk associated with exposure to site-related chemicals of potential concern (COPCs) under plausible current and future land uses.
- Identify specific areas, media, and chemicals associated with unacceptable risk.
- Provide an analysis to help in determination of the need for remedial actions at the site.

These steps will result in a quantitative and qualitative characterization of potential health risks posed to people at and near the site, assuming that no action is taken. The following subsections provide a synopsis of the site description, history, physical setting, hydrogeology, and previous site investigations at the site. More detailed descriptions are provided in the *Remedial Investigation Report, Jones Road Groundwater Plume Federal Superfund Site (SUP075)* (Shaw, 2008a).

1.2 Site Background

The Texas Commission on Environmental Quality (TCEQ), State Lead Section (SLC) (formerly the Superfund Cleanup Section), through a Cooperative Agreement with the United States Environmental Protection Agency (EPA), has conducted a Remedial Investigation (RI) at the Jones Road Groundwater Plume Superfund site (Site). The RI focused on the former Bell Dry Cleaners facility (Bell facility) located at 11600 Jones Road and a plume of contaminated groundwater that originated from the Bell facility and migrated to drinking water aquifers below adjacent residential and commercial areas. The former Bell Dry Cleaners facility is the source of groundwater contamination. The contaminated groundwater plume contains perchloroethylene (PCE; also known as tetrachloroethylene). PCE is a manufactured chemical that is widely used for dry cleaning of fabrics. Major degradation products of PCE, including trichloroethylene (TCE), cis-, and trans-1, 2-dichloroethylene (DCE), and vinyl chloride (VC) have also been detected in groundwater samples taken from plume.

The Site lies in the northwest portion of Harris County, Texas. The former Bell facility is located approximately one-half mile north of the intersection of Jones Road and FM 1960, outside the city limits of northwest Houston, in Harris County, Texas. The location of the former Bell facility and surrounding residential areas is illustrated in **Figure 1-1**.

Locally, the area is characterized by residential, commercial, and light industrial development. Jones Road is the principal north-south corridor through the area, and FM 1960 (approximately one-half mile to the south) provides a southwest-northeast corridor. Commercial development is dominant along Jones Road with residential and limited commercial development along the side streets. Residential development has been active since the 1960s effectively eliminating wildlife habitat from the area. Cypress Creek is located approximately one mile to the northwest of the subject area, and White Oak Bayou is located approximately 3,500 feet to the south.

Most homes in the study area have private water supply wells, and some homes share a single well with others. Septic systems are used in the absence of a publicly-owned treatment works (POTW). A public water supply line is currently under construction as an alternate water source to replace the private water wells that withdraw or potentially withdraw groundwater contaminated with PCE.

The property on which the former Bell facility was located consists of a rectangular parcel of land of approximately 2.1 acres in size improved with a one-story building (Cypress Shopping Center) of about 30,870 square feet containing approximately 10 tenant spaces. The former Bell facility was located on the western side of the building adjacent to Jones Road. The Cypress Shopping Center was constructed in 1984, and it is believed that the Bell facility began dry cleaning operations sometime in 1988 and continued through May 2002 before the dry cleaning operations were shut down (Shaw, 2008a).

In addition to the former Bell facility, other tenants of Cypress Shopping Center have included several restaurants, executive suites, a used book store, and an automotive service shop which conducts engine overhaul, brake repair, transmission repair and general automotive maintenance activities.

1.3 Site Hydrology

Shaw prepared a *Final Source Area Conceptual Site Model* (CSM) (Shaw, 2008b) to understand the contamination source area geology and hydrology using recent investigation data, and to aid in preparation of a pilot scale treatment study work plan. The Shaw (2008b) document incorporated information form previous hydrogeological studies at the site (Shaw, 2004, 2005, and 2006) and other references cited therein.

The site is underlain by the Beaumont Formation which is part of the Houston Group of the Pleistocene Age. This group consists of unconsolidated, alluvial, deltaic, coastal marsh, lagoonal soil material, and shallow sea deposits. It is comprised of fine gray and reddish orange sand, yellow and gray clay, and silts with sands predominating in the lower portions and clays in the upper. The Lissie formation underlies the Beaumont formation, which is also part of the Houston Group, is composed of thick beds of sand (60%) containing gravel (10%) and interbedded with sandy clay (20%) and clay (10%). This formation consists of river delta and over-bank flood deposits composed of clays and interbedded silts and fine sands that were deposited by rivers at various stages of flow and flood.

1.3.1 Regional

Water for Harris County is drawn from the Chicot and Evangeline aquifers, and from Lake Houston. The water in both aquifers is fresh (less than 1,000 milligrams per liter dissolved solids concentration), but becomes more saline in the down dip and deeply buried parts of the aquifers nearer the coast. Regional groundwater flow for these aquifers is in the south/southeast direction towards the Gulf Coast.

The Chicot Aquifer's origin is likely a fluvial-deltaic deposit that dips and thickens from the northwest to the southeast. Recharge to the Chicot occurs primarily through the direct infiltration of rainfall in the interstream, upland outcrop area. The Chicot aquifer can be differentiated from the geologically similar Evangeline aquifer on the basis of hydraulic conductivity. It is the primary aquifer where all of the private wells in the study area are completed. Surrounding communities receive their water supply through municipal utility districts which pump water from the deeper Evangeline Aquifer.

The Evangeline Aquifer is comprised of Pliocene and Miocene age sediments and underlies the Chicot Aquifer. These two aquifers are believed to be connected through a weak hydraulic connection between land surface and the Chicot aquifer and between the Chicot and Evangeline aquifers that allows vertical movement of water into and between the aquifers; the aquifer system thus is characterized as "leaky". The Evangeline Aquifer is underlain by the Burkeville confining layer which separates the Evangeline from the deeper Jasper Aquifer. The Evangeline outcrops along a narrow band north of the Chicot outcrop and is recharged directly by precipitation and surface runoff. The Evangeline is one of the more productive Texas aquifers, and is suspected to be located at a depth of 300 to 400 feet bgs in the Jones road area (Texas Department of Water Resources, Report 236).

1.3.2 Local

Both the Beaumont and Lissie Formations have been investigated through the installation of both shallow (<37 feet) and deep (>200 feet) monitor wells. The shallow wells (monitor wells MW-1 through MW-9) have been completed within the discontinuous sands of the Beaumont Formation. These wells produce water, but can be slow to recharge and can go dry during purging activities. The deeper monitor wells (MW-10 through MW-19) have penetrated through the Beaumont Formation and are completed in the deeper Lissie Formation. Here the lithology consists of interbedded clay, sand and silts. Discrete clay horizons are identified on driller's logs of private and public water supply wells in the area along with prominent sand zones. Although similar sand horizons are observed in the monitor wells installed across the site, the thicknesses of these sands can vary depending upon their depth and location suggesting fluvial deposition.

The local hydrogeology, depths of shallow and deep monitor wells, and the distribution of chemicals in shallow groundwater units are discussed in detail in the RI report (Shaw, 2008a). For purposes of this investigation, the depth to the bottom of the Chicot Aquifer and top of the Evangeline Aquifer has been estimated to be approximately 400 feet bgs. In the study area, five major groundwater bearing units have been identified within the Chicot Aquifer, and seven major groundwater bearing units have been identified within the upper Evangeline Aquifer.

Groundwater in the study area comes from mixed sources including shallow (200 to 400 ft bgs) private water supply wells, and public water sources derived from deep wells (typically greater than 600 ft bgs). Two municipal water supply wells have been identified at a distance of approximately 2.75 miles from the Bell site. At this time, no information is available to suggest that the municipal water supply wells are impacted. The large number of private water supply wells in the immediate vicinity of the source area appears to be main driving factor for the horizontal and vertical migration of dissolved-phase constituents at the site. The complex plume configuration may be explained by the interactions between the groundwater withdrawal rates from these wells, the withdrawal intervals, and regional flow. The hydrogeology in the study area is described in detail in the RI report (Shaw, 2008a).

1.4 Previous Investigations

The Jones Road Groundwater Plume Federal Superfund Site has undergone numerous investigations from November 4, 1994 to the current date by private environmental consulting companies and regulatory agencies and their subcontractors. Several soil and groundwater subsurface investigations have been conducted in the immediate vicinity of the former Bell facility since July 2001, and approximately 231 private water wells in the surrounding neighborhoods have been sampled by the TCEQ since February 2002. Approximately 150 private water supply wells are routinely sampled quarterly by the TCEQ to monitor the migration and concentration of PCE in the groundwater plume. The sampling area is larger than the known contamination plume, and includes wells with state-supplied granular activated carbon filtration systems where confirmed PCE concentrations are above the EPA maximum contaminant level (MCL) of 5 micrograms per liter (ug/L). The MCL is established in the Save Drinking Water Act (SDWA) standards for drinking water and described in 40 Code of Federal Regulations (CFR) Part 141, as amended. Under current sampling guidance, all water supply wells in the study area with measurable concentrations of PCE, and wells located in areas threatened by the migration of contaminants, are included in the quarterly sampling regime.

A chronology of previous site investigations and significant events is summarized in detail on the TCEQ web page, “Continuation of Jones Road History of Actions” located at:

http://www.tceq.state.tx.us/remediation/superfund/jonesroad/fullhistroy.html. Previous investigations that are pertinent to the risk assessment are described in the RI report (Shaw, 2008a) and are summarized below.

In June 2005, the TCEQ prepared a Revised Conceptual Site Model (CSM) for the site, with sections of the CSM focused on the Bell facility (Shaw, 2008a). The CSM provided a site description, initial CSM scenarios, description of exposure pathways and routes, and fate and transport characteristics. Several model scenarios were considered, but the most likely scenario was determined to be vertical migration of PCE as dense non-aqueous phase liquid (DNAPL) to deeper aquifers, and lateral migration of dissolved phase PCE to shallow and deep aquifers.

Shaw prepared a *Final Source Area Conceptual Site Model* (Shaw, 2008b) to evaluate the contamination source area geology using recent investigation data. The Source Area CSM included cross sections and a fence diagram in the Cypress Shopping Center area, showing the local geology and distribution of PCE in soil and groundwater. The report noted primary downward migration of PCE immediately near the Bell facility and horizontal movement of PCE in groundwater-bearing units below the facility.

Shaw performed a Geoprobe investigation at the Bell facility to gather recent soil and groundwater samples and geochemical and geotechnical information. The report, July 2006 Geoprobe Investigation (Shaw, 2007a) documented the installation of nine DPT borings to depths of approximately 50 feet bgs. The study concluded that the upper 35 feet of soils above the soil/water interface are primarily impacted with PCE, and no DNAPL was observed. Contaminants in groundwater were primarily PCE, but degradation products of TCE, DCE, and VC were also present, although more evident in groundwater than soil.

Shaw performed a vapor intrusion study at the Bell facility in February 2008 (Shaw, 2008c) to determine if completed pathway(s) exist for intrusion of vapors from the Bell facility to workers in the Cypress Shopping Center, and whether indoor vapors could pose an unacceptable risk of chronic health effects due to long-term exposure. Results of laboratory analysis were compared to the Tier II Table from the Office of Solid Waste and Emergency Response (OSWER) Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils. Vapor concentrations of PCE and TCE measured indoors exceeded USEPA (2002a) screening criteria. Results of this study indicated that a complete pathway for vapor intrusion exists. The indoor concentrations of PCE, TCE, and related decomposition products are used in this BLRA (**Section 1.5**) to evaluate the indoor vapor inhalation exposure pathway. The TCEQ has developed exposure limits for the vapor inhalation pathway, designated as risk-based exposure limits (${}^{Air}RBEL_{Inh}$). Although these values wee not intended specifically for the evaluation of indoor air exposures, they are considered in the evaluation of indoor air data (**Section 2.4.4**)

1.5 Baseline Risk Assessment

This BLRA is conducted to quantitatively and qualitatively characterize the potential health risks posed to people from contaminants at the site, assuming that no action is taken. Previous investigations (**Section 1.4**) have shown that use of groundwater and inhalation of indoor air are potential exposure pathways that could contribute to human health risk. The physical characteristics of the chlorinated hydrocarbons being investigated at this site enable them to be classified as volatile organic chemicals (VOCs), as they will evaporate when in contact with air. This risk assessment, therefore, focuses on PCE and its major degradation products, including TCE, cis-, and trans-DCE, and (VC) at concentrations that have been measured in groundwater and indoor air media.

Potential ecological risks for the site are evaluated according to the Tier I Ecological Criteria Checklist specified in Title 30 of the Texas Administrative Code [30 TAC §350.77(b)].

1.5.1 Groundwater

Groundwater used in the study area generally comes from shallow private water supply wells and public water sources derived from deeper wells (see **Section 1.3.2**). The large number of private water supply wells in the immediate vicinity of the source area provides the main driving factor for delineation of the horizontal and vertical migration of dissolved-phase constituents at the site. Municipal water supply wells are located 2.75 miles from the site and are not considered in this BLRA.

Since February 2002, groundwater samples have been collected from private wells where access was granted by property owners (**Figure 1-2**). Groundwater sampling has been conducted quarterly at most of these private well locations since 2002, although individual wells have been added since, and some wells have been removed from the sampling program after they were shown to be unaffected (TCEQ, 2008a). Selected private wells have been supplied with a carbon filtration system (**Figure 1-2**) as discussed in **Section 2.2.1**.

Harris County has promulgated regulations (effective July 2007) that prohibit drilling in contaminated groundwater plumes. The Texas Department of Licensing and Regulation (TDLR) required that all new wells within the area must be drilled to the Evangeline aquifer with a borehole 3 inches larger than the outside diameter of the casing, and the space must be pressure cemented to a depth of 400 ft bgs (TDLR, January 24, 2003).

Shallow monitor wells have been installed to monitor shallow Beaumont Formation groundwater zone within the upper 35 feet bgs, but these wells can be slow to recharge and can go dry during purging activities. Deeper monitor wells were installed to sample groundwater from the Chicot Aquifer and one well (MW-17) extends into the top of the Evangeline Aquifer.

1.5.2 Indoor Air

Indoor air is considered an important pathway for the investigation of both current and future risk at the site. The process of vapor intrusion involves the movement of VOCs from groundwater or subsurface soil into overlying structures. In these structures, chemicals may accumulate to concentrations that pose a risk of health effects for long-term exposures. Following the document *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils* (Vapor Intrusion Guidance, USEPA, 2002a), a standard assessment of the vapor intrusion pathway involves the use of a multi-step screening evaluation to determine whether the vapor intrusion exposure pathway is complete, and, if so, whether additional evaluation is required.

For this BLRA, a standard screening step was not performed, and indoor air samples were collected directly as described in the Vapor Intrusion Study Work Plan (Shaw, 2007b). Risk from inhalation of VOCs was evaluated using the analytical results of these samples as reported in (Shaw, 2008c).

1.6 Report Organization

This report is divided into the following sections:

- Section 1 – Objectives and Site Description presents the objectives and site-related information including a description of the site and previous site investigations.
- Section 2 – Data Evaluation and Reduction presents an evaluation and summary of the chemicals detected in the media of concern at the site.
  - The evaluation of groundwater data from contaminated plume wells (**Tables 2-1** through **2-5**)
  - The evaluation of indoor air data (**Table 2-6**)
  - The selection and identification of COPCs for each medium contributing to current or future exposure pathways for which human health risks were assessed.
- Section 3 – Exposure Assessment presents (1) potentially affected population, (2) the pathways by which onsite and offsite receptors could encounter the COPCs, (3) the calculated exposure point concentrations (EPC), and (4) the exposure algorithms and input assumptions used to calculate the daily doses. Reasonable maximum exposures (RME) are evaluated using bounding parameter values for exposure parameter distributions, as recommended in guidance from USEPA documents.
- Section 4 – Toxicity Assessment presents a discussion of the cancer and non-cancer toxicity values that were used to evaluate pathway-specific human health risk.

- Section 5 – Risk Characterization summarizes and discusses the human health risk results for all of the COPCs and presents the risk summary tables.
- Section 6 – Uncertainty Analysis discusses those chemical/pathway-specific risks that had the greatest influence on total risk and the overestimation or underestimation of risk that may have occurred because of the assumptions used in the BLRA.
- Section 7 – Ecological Risk Assessment
- Section 8 – References
- Appendix A Risk Assessment Tables
- Appendix B TCEQ Tier I Exclusion Criteria Checklist for the Ecological Evaluation

2.0 Data Evaluation and Reduction

2.1 Objective

The objectives of data evaluation include the following:

- Review and summarize the analytical data for each environmental medium sampled.
- Perform a screening level assessment of the data to select the COPCs retained for evaluation in the BLRA.

Data reviewed for use in the risk assessment were obtained from the TCEQ groundwater monitioring program and airborne vapor sampling.

Approximately 231 private water wells have been sampled by the TCEQ in neighborhoods surrounding the former Bell facility since February 2002, and approximately 150 private water supply wells are routinely sampled quarterly by the TCEQ to monitor the migration and concentration of PCE in the groundwater plume. Results of private water well sampling and sampling of monitor wells MW-1 through MW-19 have been reported periodically to TCEQ, and USEPA Region 6 offices. For this BLRA, groundwater data have been restricted to samples collected from August 2005 until November 2007. These data represent the groundwater plume characteristics most representative of current conditions, and provide a sufficient time span to capture seasonal variability in the concentrations. Groundwater data are shown in **Tables 2-1** through **2-5**.

- Indoor air investigations conducted by Shaw as described in the RI Report and the Vapor Intrusion Study work plan (Shaw, 2007b, 2008a).

2.2 Sampling Locations by Medium

2.2.1 Groundwater

Groundwater wells sampled during the RI are shown in **Figure 1-2**. Shallow monitor wells (wells MW-1 through MW-9) have been installed to monitor shallow Beaumont Formation groundwater zone within the upper 35 feet bgs, but these wells can be slow to recharge and can go dry during purging activities. These shallow wells do not monitor the aquifer accessed by private wells, and are not included in the BLRA. Deeper monitor wells (MW-10 through MW-16, and MW-18 and MW-19) have been installed to sample groundwater from 294 ft bgs to 357 ft bgs in the Chicot Aquifer and one well (MW-17) extends into the top of the Evangeline Aquifer at 445 ft bgs. Locations of monitor wells are shown in **Figure 1-2**.

Groundwater samples have been collected from private wells where access was granted by property owners since February 2002, (**Figure 1-2**), although individual wells have been added since 2002, and some wells have been removed from the sampling program after they were shown to be unaffected (TCEQ, 2008a). Quarterly sampling the monitor wells has continued since the time each well was installed. Certain private wells were supplied with a carbon filtration system after they were shown to contain PCE concentrations above the MCL of 5.0 µg/L (**Figure 1-2**). The RI Report provides a complete list of all monitoring wells at the site, with descriptions of well characteristics and groundwater elevation over time.

Following a series of public meetings, it was decided to install a water line to supply drinking water to properties affected by the contamination plume around the Bell site. The boundaries of properties that will be provided municipal water are shown in **Figure 1-2**.

2.2.2 Indoor Air

Airborne vapor sampling was conducted as described in the work plan (Shaw, 2007b). Two 15-minute subslab soil vapor samples, one 24-hour indoor air sample, and one 36-hour indoor air sample were collected in February 2008. The samples were collected to help determine whether a complete pathway for vapor intrusion exists and if the concentrations of the indoor vapor pose an unacceptable risk of chronic health effects due to long-term exposure to workers in the shopping center.

One location was chosen to represent the area of the building where the majority the dry-cleaning operations were conducted when Bell Dry Cleaners operated and is where the former floor drain was located (the West Sump location). The other location selected was near the center of the same room where the dry cleaner operated (the Center Room location). The subslab samples were collected below the slab in the same areas where the indoor air samples were collected.

Indoor air samples were collected using Summa canister sampling units placed within the normal breathing zone, approximately 2 to 5 feet above the floor, in the lowest inhabited area. USEPA Test Method TO-15 was used for laboratory testing of indoor air samples. The RI Report provides a complete list of airborne vapor sampling locations, site sampling activities, data quality evaluation, and analytical results. Results of the study were reported (Shaw, 2008c).

2.3 Summary of Sampling Data

2.3.1 Groundwater

A plume of groundwater contaminated with chlorinated solvents has been identified extending north, south and west of the source of the former Bell Cleaners. PCE is the primary contaminant; however, groundwater samples were analyzed for the PCE degradation products: TCE, cis-1,2-DCE, trans-1,2-DCE, and VC.

Groundwater wells sampled during the RI include nine shallow monitor wells that were installed within the upper 35 feet bgs near the source area. These wells can be slow to recharge and can go dry. Ten deeper monitor wells were installed in outer regions of the plume to sample groundwater from 294 ft bgs to 357 ft bgs, and one well extends to 445 ft bgs. Quarterly sampling of the monitor wells has continued since the time each well was installed.

Groundwater samples also were collected from private wells, although the number of wells sampled has varied since 2002, since some wells were added, and some were removed from the sampling program after they were shown to be unaffected (TCEQ, 2008a). Certain private wells were supplied with a carbon filtration system after they were shown to contain PCE. Municipal drinking water will be supplied to properties affected by the contamination plume.

The distribution of PCE in evaluated groundwater wells shows that PCE concentrations exceed the MCL of 5 µg/L in wells located at Echo Spring Lane, Forest Valley Drive, Jones Road, Timber Hollow, Tower Oaks Boulevard, and Tall Timbers Drive (**Table 2-1**). Groundwater from wells at other locations contained PCE detected at concentrations below the MCL value or undetected concentrations. The PCE concentration detected above the MCL at the Timber Hollow location (TH11723) in February 2006 was not confirmed in later quarterly sampling events through 2007. The PCE concentrations measured at the Echo Spring Lane location (ES11627) in February and May 2007 were not confirmed later in 2007 (**Table 2-1**). PCE concentrations were measured above the MCL at the Tower Oaks Boulevard location (TO11024) in 2005 and early 2006, but the well was not sampled subsequently.

PCE concentrations above the MCL were measured intermittently at one Tall Timbers Drive location (TT11123) and at one Jones Road location (JR11528). PCE concentrations were measured consistently above the MCL value at Tall Timbers Drive locations (TT11014, TT11015, and TT11031), one Forest Valley Drive location (FV11130), and at one Jones Road location (JR11535).

One PCE concentration was reported as undetected for the sample taken from MW-14 in August 2005 (**Table 2-1**). The U-qualified value indicates that the detection limit for that sample was elevated by a factor of 10 to 20 compared to the detection limits reported for analyses of later samples from this well. This elevated detection limit affects all results reported for other COPCs (**Tables 2-1** through **2-5**) and commonly results from a sample-specific dilution factor required to successfully complete the analysis.

The distribution of TCE in evaluated groundwater wells shows that TCE concentrations exceed the MCL of 5 µg/L at one Jones Road location (JR11515) in August 2005, but the well was not sampled subsequently (**Table 2-2**). TCE concentrations were measured above the MCL in samples collected from February through August 2007 at the Tall Timbers Drive location (TT11014). This location also contained PCE concentrations above the MCL in samples from all sampling events in 2005 through 2007 except one (**Table 2-1**). Groundwater from wells at other locations contained TCE detected at concentrations below the MCL value or undetected concentrations. The August 2005 sample had an elevated detection limit as described above.

Groundwater from all wells sampled between 2005 and 2007 contained cis-1,2-DCE and trans-1,2-DCE concentrations detected at concentrations below their respective MCL values or undetected concentrations (**Tables 2-3** and **2-4**).

Groundwater from all private wells sampled between 2005 and 2007 contained vinyl chloride detected at concentrations below the MCL value (2 µg/L) or undetected concentrations (**Table 2-5**). Vinyl chloride concentrations above the MCL were measured intermittently at monitoring wells MW-11R and MW-18.

These results indicate that PCE is the most widely distributed of the COPCs, but the greatest concentrations are located in the vicinity of Tall Timbers Drive and Jones Road. One location on Forest Valley Drive and one on Tower Oaks Boulevard also have PCE concentrations above MCL values in groundwater. TCE concentrations above MCL values are co-located with elevated PCE concentrations. Concentrations of cis- and trans-1,2-DCE are below MCL values at all locations. Vinyl chloride is below MCLs at all private well locations, but is elevated at two monitoring well locations.

2.3.2 Indoor Air

Indoor air monitoring was conducted to evaluate potential vapor intrusion exposure pathways at the Cypress Shopping Center where the former Bell Dry cleaners was located. Indoor air was sampled directly at the West Sump and Center Room locations (Shaw, 2008c), and the samples were analyzed for PCE and degradation products. Trans-1,2-DCE and vinyl chloride were not detected at either location. PCE, TCE, and cis-1,2-DCE were detected and were considered in the screening and data evaluation process (**Table 2-6)**.

2.4 Screening of Data

2.4.1 Risk-Based Screen

The identification of COPCs among chemicals detected in environmental media by using risk-based screening values is described in USEPA guidance entitled *Risk Assessment Guidance for Superfund Volume I, Human Health Evaluation Manual, Part A* (USEPA, 1989a).

2.4.2 Groundwater

To determine the initial COPCs for groundwater, the maximum detected value for each contaminant was compared to its risk-based screening level. The risk-based used values are the Medium-Specific Screening Levels (MSSLs) for groundwater provided in USEPA guidance entitled *EPA Region 6, Human Health, Medium-Specific Screening Levels* USEPA (2007). The MSSLs are associated with a cancer risk of 1E-06 and a systemic noncancer hazard index (HI) of 1. Where a chemical has risk-based values for cancer and non-cancer endpoints, the lower (i.e., more stringent) value was used for the screen. Protective concentration levels (PCLs) for groundwater ingestion (${}^{GW}GW_{Ing}$) were used as specified in the 30 Texas Administrative Code (TAC) §350.71(k). Because all of the COPCs in groundwater at the Site have published MCLs, the ${}^{GW}GW_{Ing}$ values equal the EPA MCLs for drinking water.

It is assumed in this risk assessment that the groundwater from any of the wells could be used as a drinking water source. The BLRA for groundwater compared concentrations of COPCs to the lower value of the MSSLs and the groundwater ingestion (${}^{GW}GW_{Ing}$) PCL. If the maximum concentration of a chemical is below the lower of the MSSL and ${}^{GW}GW_{Ing}$ values, the chemical was removed from consideration in the BLRA. If the maximum concentration of a chemical is above the lower of the MSSL or ${}^{GW}GW_{Ing}$ values, the chemical was identified as a COPC for groundwater, and the risk from exposure to that chemical was assessed. If a chemical is shown to present either a carcinogenic risk of 1E-06 or greater, or a noncancer HQ greater than one, it is considered a chemical of concern (COC).

At chlorinated solvent sites, PCE and its degradation products are commonly identified as COCs, and their MCLs are selected as cleanup levels in the Record of Decision. The basis for this approach is Office of Solid Waste and Emergency Response (OSWER) Directive 9355.0-30, *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions* (USEPA, 1991a), which states that chemical-specific standards that define acceptable risk levels (e.g., MCLs) may be used to determine whether an exposure is associated with an unacceptable risk to human health or the environment and whether remedial action is warranted.

The MSSL and ${}^{GW}GW_{Ing}$ values for the COPCs are:

PCE	MSSL Residential Water = 1.0E-01 ug/L, ${}^{GW}GW_{Ing}$ = 5 ug/L
TCE	MSSL Residential Water = 2.8E-02 ug/L, ${}^{GW}GW_{Ing}$ = 5 ug/L
cis-1,2-DCE	MSSL Residential Water = 6.1E+01 ug/L, ${}^{GW}GW_{Ing}$ = 70 ug/L
trans-1,2-DCE	MSSL Residential Water = 1.1E+02 ug/L, ${}^{GW}GW_{Ing}$ = 100 ug/L
VC	MSSL Residential Water = 1.5E-02 ug/L, ${}^{GW}GW_{Ing}$ = 2 ug/L.

Because the risk-based MSSL Residential Water values for PCE, TCE and VC screening values are less than the detection limits for these chemicals in water (**Tables 2-1, 2-2,** and **2-5**), the ${}^{GW}GW_{Ing}$ values for these chemicals were used in the screening step to identify COPCs. The MSSL value for cis-1,2-DCE is less than the ${}^{GW}GW_{Ing}$, and was used in the screening step for cis-1,2-DCE. The ${}^{GW}GW_{Ing}$ value for trans-1,2-DCE is less than the MSSL, and was used in the screening step for trans-1,2-DCE.

2.4.3 Indoor Air

Concentrations of vapor measured indoors at the site were compared to draft USEPA (2002a) air screening levels. Site-related contaminants (PCE, TCE, and cis-l,2-DCE) were detected, with PCE and TCE measured above conservative draft USEPA screening levels in both indoor air samples.

The VOCs detected in subslab soil vapor were PCE, TCE, and cis-1,2-DCE, the same site-related VOCs detected in indoor air. PCE and TCE were detected in both subslab soil vapor samples at concentrations well above draft USEPA screening values for subslab soil vapor designed to be protective of indoor air. Shaw examined these subslab soil vapor concentrations along with their co-located indoor air samples to calculate site-specific attenuation factors, which ranged from 0.0002 to 0.0009, indicating very low migration of vapors from the subslab to indoor air. The comparison for these site-related compounds indicates that, although intrusion of is potentially a complete pathway, very little vapor is currently migrating from the subslab soil into indoor air (TCEQ, 2008b).

2.4.4 Data Qualifiers

Data qualifiers were reviewed to determine which data would enter the screening process:

- **J** – Indicates an estimated value detected above the detection limit but below the reported quantitation limit
- **L** – Indicates a low bias to its associated value
- **U** – Indicates that a chemical was analyzed for, but not detected at the reported quantization limit.
- **R** – Indicates that the data are rejected.

If a chemical is not detected (U-qualified) in every sample, that chemical is not considered in the screening process and is not included in the risk assessment. Any chemical with at least one detected concentration was included in the screen.

Based on an initial risk-based screen, the following constituents for each medium are identified as COPCs for the BLRA.

Groundwater: PCE, TCE and VC.
Although groundwater has been monitored at the Jones Road site since 2002, the risk assessment is limited to data from samples collected between August 2005 and November 2007. Groundwater collected from these latter sampling events more closely represents current groundwater conditions than samples collected prior to that date, and represents an 18 month period of sufficient length to represent seasonal variability.

Comparison of the maximum concentrations of the chemicals measured in groundwater (**Tables 2-1** through **2-5**) to the groundwater screening values shows that maximum PCE (**Table 2-1**), TCE (**Table 2-2**), and VC (**Table 2-5**) exceed screening values. The maximum concentration of cis-1,2-DCE is below the MSSL screening value (61 ug/L, **Table 2-3**) and the maximum concentration of trans-1,2-DCE is below the TCEQ screening value ($^{GW}GW_{Ing}$ = 100 ug/L, **Table 2-4**). Therefore, PCE, TCE and VC are identified as COPCs for the risk assessment of groundwater and cis- and trans-1,2-DCE are not identified as COPCs and are excluded.

Indoor Air: PCE, TCE and VC
Two samples of indoor air were analyzed (Shaw, 2008c). Analytical results are reproduced in **Table 2-6**. Screening values are provided by the Tier II table from USEPA (2002a) guidance.

Table 2-6
Indoor Vapor Concentrations of PCE and Degradation Products
Jones Road Superfund Site
Houston, Texas

Indoor (Ambient) Sampling Location	PCE (ug/m^3)	TCE (ug/m^3)	cis-1,2-DCE (ug/m^3)	trans-1,2-DCE (ug/m^3)	VC (ug/m^3)
West Sump	9.5	1.7	1.7	<0.79	<0.51
Center Room	14	1.8	1.8	<0.79	<0.51
Screening Value (Shaw, 2008c; USEPA, 2002a)	8.1	0.22	35	70	2.8
Determination	Designate as a COPC for BLRA	Designate as a COPC for BLRA	Exclude from BLRA	Exclude from BLRA	Exclude from BLRA
TCEQ RBEL – Commercial/Industrial Use [a]	110	8.0	1200	1200	4.9
TCEQ RBEL – Residential Use [a]	64	5.7	830	830	2.9

[a] Values are ${}^{Air}RBEL_{Inh}$ PCL values that are protective of vapor inhalation exposure and were provided to Shaw by the TCEQ for information purposes (TCEQ, 2008c). The COPC designations are based on comparisons to EPA Screening Values shown.

2.4.5 Further Reduction of COPCs

The quantitative assessment of exposure and risk for a site is based on those chemicals considered COPCs for the site. The COPCs are a subset of all the chemicals positively identified at a site and are those chemicals associated with site activities, and which are expected to pose more significant risks than other less toxic and less prevalent site chemicals that are not evaluated quantitatively. Because PCE was used in the dry cleaning process at the Bell Cleaners facility, PCE and its potential degradation products (TCE, and VC) are considered to be of potential concern at the site. Therefore, none of the COPCs identified in groundwater was excluded from the BLRA based on a frequency of detection evaluation.

2.4.6 Regulatory Screen

The regulatory screen only applies to contaminants in groundwater. Once the COPCs for groundwater have been determined via the risk-based screen, those chemicals were compared to their MCLs. MCLs are promulgated by the SDWA and are commonly used for the remediation of groundwater at Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) sites. MCLs are regarded in Superfund as applicable or relevant and appropriate requirements (ARARs), and USEPA is authorized to implement a remedial action when those ARARs are exceeded. OSWER Directive 9355.0-30, *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions* (USEPA, 1991a), clarifies the role of the baseline risk assessment in developing Superfund remedial alternatives and supporting risk management decisions. It also includes guidance on the use of MCLs in this process.

For chemicals that have an MCL, the TCEQ PCL value (${}^{GW}GW_{Ing}$) corresponds to the MCL for the chemical (30 TAC §350).

Table 2-7 presents the regulatory screen, showing COPCs from the risk-based screen along with available MCLs.

Table 2-7
Comparison of Groundwater Concentrations to Regulatory Screening Values (MCLs)
Jones Road Superfund Site
Houston, Texas

COPC in Groundwater	MCL (ug/L)	Determination

PCE	5	Designate as a COC
TCE	5	Designate as a COC
Vinyl Chloride (VC)	2	Designate as a COC

Regulatory Screen Results:
PCE, TCE, and VC all have MCLs. Therefore, these chemicals are designated as COCs at locations where municipal water will be supplied, and are not carried through the risk assessment for these locations. For private water well locations where use of municipal water is not anticipated, the groundwater risk assessment is based on exposure to PCE, TCE, and VC.

3.0 Exposure Assessment

3.1 Objectives

The objectives of the exposure assessment are to characterize potentially exposed human populations near the site, to identify actual or potential exposure pathways, and to determine the extent of potential current and future exposures.

The exposure assessment involves several key elements, including the following:

- Definition of local land and water uses
- Identification of the potential receptors and exposure scenarios
- Identification of exposure pathways and routes
- Estimation of exposure point concentrations

The following narrative discusses each of these technical elements in relation to the site. The BLRA follows the approach described in USEPA (2001) guidance. All the tables referenced in this section are located in **Appendix A**.

3.2 Land and Water Uses

Land and water use patterns are used to determine potential exposure pathways. The site is located in an area that is a mix of residential and commercial properties northwest of the City of Houston in Harris County, Texas. Private water wells in the vicinity are described in **Sections 1.2** and **1.3**.

3.3 Identification of Potential Receptors/Exposure Scenarios

This step of the assessment involves the prediction of the activity patterns of potentially exposed populations and selection of the current and future receptors. To evaluate exposure over a range of possible conditions that may exist at the site, two hypothetical degrees of exposure are normally considered in a risk assessment: reasonable maximum exposure (RME) and central tendency exposure (CTE). While the RME does not represent the maximum exposure expected at a site, it does represent the highest exposure that is reasonably expected to occur. The CTE is intended to represent more typical (i.e., central tendency or average) exposure conditions.

The exposure assessment of groundwater is based on the 95% UCL of PCE, TCE, and VC concentrations in groundwater from private water wells located where municipal water use is not anticipated (**Section 2.4**).

EPA (1989a) guidance (*Risk Assessment Guidance for Superfund Volume I, Human Health Evaluation Manual, Part A*) does not allow assumption of a proposed remediation action in a baseline risk assessment. Accordingly, the BLRA provides the driver for further use of remediation or institutional controls at a site. However, supply of municipal drinking water supply is a control measure that is being actively implemented and agreements are being made with individual residents for connection to a municipal drinking water supply (**Figure 1-2**). This BLRA addresses water wells located where municipal water use is not anticipated while these agreements are being made to provide additional information support or modify the approved control measures as needed. The 95% UCL was calculated as recommended in the Scope of Work and an example streamlined risk assessment template provided by USEPA. However, individual private well users may be exposed to COPC levels in their well above those represented by a 95% UCL across wells. There may be an unacceptable drinking water risk to these individuals in the future, if COPC concentrations remain above the federal MCL. Please see **Section 5.4** (Summary and Conclusions) for a discussion of how MCLs may be used to evaluated drinking water exposure.

Because only two indoor air samples were analyzed, no statistical analysis of the vapor concentration values was made; the exposure assessment was made using the maximum concentration of each COPC (**Table 2-6**).

This BLRA evaluated *Current and Future* exposure scenarios that consider current indoor air contaminant concentrations in conjunction with groundwater exposure pathways that are either currently complete or are considered as potentially complete in the near future.

While the risk from ground water could be evaluated for any potential receptor, the adult and child resident are assumed to have the highest degree of exposure to groundwater from the private water wells at locations not anticipated to be supplied with municipal water in the future. This exposure includes drinking water ingestion. Indoor air samples were collected from structures located nearest to the known or expected areas of greatest release (Shaw, 2008a, 2008c). As such, exposure to indoor air will be evaluated for the appropriate receptor in each structure (adult resident, child resident and indoor workers).

It is assumed that municipal water is supplied to indoor workers at businesses or similar work locations. Therefore, the drinking water pathway is assumed to be incomplete for indoor workers. There is a potential scenario of worker exposure to groundwater at a business location that is not anticipated to receive a municipal water supply. All private wells located in such areas are included in the data set for the residential risk assessment (**Section 2**) and, therefore, would be the same drinking water source for potential worker use. Because the residential groundwater exposure assessment is based on more frequent exposure than the worker exposure (350 days/year and 250 days/year, respectively), and on longer exposure duration (30 years and 25 years, respectively), the residential assessment is protective of potential worker exposures to the same groundwater source.

3.4 Identification of Exposure Pathways and Routes

The following discussion presents a brief overview of the various exposure pathways and routes, which were evaluated for the Jones Road site:

- **Groundwater Exposure Pathways/Routes –** Residents at locations within the groundwater plume, who are not anticipated to receive municipal water, are expected to be exposed to constituents in groundwater through the ingestion pathway. Although EPA (1989a) guidance does not allow a remedy to be assumed in the BLRA, a control measure is being implemented at the Jones Road site. This BLRA applies to those groundwater wells not currently included in the approved control measure (see **Section 3.3**).

- Indoor Air Exposure Pathways/Routes – Inhalation exposure or residents and indoor workers to VOC vapors are evaluated. No control measures are available to control exposures to indoor vapor that are analogous to those approved for groundwater. Therefore, measured indoor vapor concentrations were assessed under both commercial/industrial and residential land use assumptions, although no residential use of the Site is anticipated. The data applied to a hypothetical resident at the Site were measured at the Site and not in any residential locations.

3.5 Exposure Point Concentrations

Groundwater: To characterize the risk from future direct exposure to PCE, TCE, and VC in groundwater, an EPC was calculated from the subset of private wells that are not anticipated to receive municipal water and samples collected between August 2005 and November 2007 (**Section 2.4.4**). In addition to the EPC determination to calculate risk, any individual well that has concentrations of a COPC that exceed its federal MCL may not meet the requirements of the Safe Drinking Water Act.

The EPC represents the 95% UCL of the mean chemical concentration of each chemical. The following guidelines were used in the calculation of an EPC:

- If a chemical was reported as non-detect in a sample, it was assumed to be present at the full value of the reported detection limit in the calculation of the 95% UCL of the mean concentration.

- When duplicate samples were taken from the same location, the larger value was used in the 95% UCL calculation.

Use of the full value of the detection limit and the larger of duplicated measurements represents a conservative assumption that is expected to introduce high bias to the 95% UCL.

The 95% UCL concentrations of COPCs in groundwater were calculated using bootstrapping methods (Efron and Tibshirani, 1993), as provided in USEPA (2002b) guidance. The 95% UCL of each COPC in groundwater were as follows:

PCE = 3.71 ug/L

TCE = 0.663 ug/L

VC = 0.614 ug/L.

These values are used as the EPCs for the assessment of groundwater exposure. This information is presented in RAGS D Table 3.1 of **Appendix A**.

Indoor air: The maximum of two indoor measurements of airborne VOC concentrations were made for use in the risk assessment. The maximum concentrations were all measured at the Center Room location (**Table 2-6).** The EPCs for various indoor air COPCs are: PCE = 14 µg/m^3 and TCE = 1.8 µg/m^3. This information is presented in more detail in RAGS D Table 3.2 of **Appendix A**.

3.6 Identification of Exposure Assumptions

Mathematical models were used to calculate the intakes (i.e., the doses) of the COPCs for each receptor, using applicable exposure routes. The models used to calculate intakes are presented in RAGS Tables 4.1 and 4.2 in the **Appendix A**. Each table defines the variables used in estimating doses and includes the exposure values that are used in the model. These parameters include variables such as daily ingestion rate of water, exposure duration, and body weight. In general, the exposure parameters that were used are standard values recommended by national and USEPA Region 6 guidance (USEPA, 2007). Regardless of the exposure route, the intake is presented as an estimated daily dose in units of milligrams of chemical per kilogram of body weight per day (mg/kg-day).

4.0 Toxicity Assessment

4.1 Introduction

This section presents the toxicity values for the COPCs evaluated in the BLRA. These values are applied in the risk characterization to the estimated daily intake doses calculated in **Section 3** to determine potential cancer risks and non-cancer hazards. The toxicity assessment follows the methodology described in USEPA (1989a) guidance. The TCEQ would recommend slightly different toxicity values than those recommended by USEPA for several of the Jones Road COPCs; however, it was ultimately determined that regardless of which toxicity values were used, the final risk assessment conclusions regarding the Site would not be impacted.

Both cancer and adverse non-cancer health effects of a chemical are considered in predicting potential human health risks. The potential for producing cancer is evaluated only for those chemicals where data from humans and/or animals are sufficient to identify the chemical as a carcinogen. Cancer toxicity is characterized by a cancer slope factor (SF) that indicates the risk of cancer expected to result from a certain level of exposure.

Non-carcinogenic reference doses (RfDs), non-carcinogenic inhalation reference concentrations (RfCs), and carcinogenic slope factors (SFs), were selected from the USEPA Region 6 MSSLs document (USEPA, 2007). These toxicity values were obtained from the Integrated Risk Information System (IRIS) or the National Center for Environmental Assessment (NCEA).

Exposure pathway-specific toxicity values selected for the BLRA were: oral reference doses (RfDo), inhalation reference doses (RfDi), and oral and inhalation slope factors SFo and SFi, respectively. For TCE, toxicity values from the California Environmental Protection Agency (Cal-EPA) were used either in place of or in conjunction with USEPA values for ingestion and inhalation. Toxicity endpoints, upon which the non-cancer values are based, were identified from the appropriate reference source. Because many carcinogens also produce known non-cancer health effects, both noncancer RfDs and SFs were used to assess both cancer and noncancer health effects for such chemicals.

4.2 Non-Carcinogenic Effects

4.2.1 Estimates of Non-Carcinogenic Toxicity Values

Toxicity values used to evaluate potential non-cancer adverse health effects are RfDs. In contrast to the approach used in evaluating cancer, for non-cancer effects, it is assumed a threshold exposure dose or concentration exists, below which human toxicity will not occur. Non-cancer toxicity values are developed by the USEPA to express that threshold in terms of chronic daily intake of a chemical to which an individual can be exposed without expected non-carcinogenic effects occurring over a given exposure duration. These values are presented in units of mg/kg-day. These thresholds are the RfDo for ingestion and the RfC for inhalation.

The RfD/RfCs are derived from a no-observed-adverse-effect level (NOAEL) or lowest-observed-adverse-effect level (LOAEL) obtained from human or animal studies. Criteria for choosing the appropriate NOAEL or LOAEL are discussed in USEPA's risk assessment guidance (EPA, 1989a). RfDs/RfCs are derived by the application of uncertainty factors to the NOAEL or LOAEL. In some cases, an additional modifying factor is applied to account for a professional assessment of scientific uncertainties in the available database. Generally, uncertainty factors are applied by dividing the observed NOAEL or LOAEL by 10 for each category of uncertainty that applies, i.e., use of a LOAEL rather than a NOAEL, extrapolation from another species, or predicting toxicity levels outside of the specific dose range tested in the laboratory. The modifying factor can then divide the resulting number by a factor from 1 to 10 that is based on the level of confidence in the study. The net result is that the final RfDs/RfCs may reflect a value several orders of magnitude below that at which any toxic effects have ever been observed in any species. Therefore, they provide a conservative evaluation of environmental exposures that are protective of sensitive populations. The following RfD information is also presented in RAGS D Tables 5.1 and 5.2 in **Appendix A**.

Ingestion Route:
The COPCs considered for non-carcinogenic effects from groundwater ingestion are PCE, TCE, and VC, which have available chronic non-cancer ingestion toxicity values (RfDo). The RfDo for each chemical is as follows: PCE = 1.0E-02 mg/kg-day; TCE = 3.0E-04 mg/kg-day; and VC = 3.0E-03 mg/kg-day.

Inhalation Route:
The COPCs considered for non-carcinogenic effects from inhalation of indoor air are PCE, and TCE, which have available chronic non-cancer inhalation toxicity values (RfDi or RfC). In the case of only an RfC being available, the RfC was converted to an RfDi by multiplying by an inhalation rate of 20 cubic meter per day (m^3/day) and dividing by an adult body weight of 70 kg. The RfDi for each chemical is as follows: PCE = 1.1E-01 mg/kg-day and TCE = 1.1E-02 mg/kg-day.

4.3 Carcinogenic Effects

4.3.1 Estimates of Carcinogenic Toxicity Values

The toxicity value used to evaluate potential carcinogenic health effects is the SF. For carcinogenic effects, it is assumed that there is no level of exposure that does not pose a small probability of a carcinogenic response. Therefore, carcinogenic toxicity values are developed by the USEPA to express the SF in terms of that probability per unit of daily intake (CDI): $[mg/kg\text{-}day]^{-1}$. The following SF information also is presented in RAGS D Tables 6.1 and 6.2 in the **Appendix A**.

Ingestion Route:
The COPCs considered for carcinogenic effects from ingestion of groundwater are PCE, TCE, and VC which have available ingestion SFo values. The SFo for each chemical is as follows: PCE = 5.4E-01 $[mg/kg\text{-}day]^{-1}$; TCE = 4.0E-01 $[mg/kg\text{-}day]^{-1}$, and VC = 7.2E-01 $[mg/kg\text{-}day]^{-1}$ (adult exposure) and 1.5E-00 $[mg/kg\text{-}day]^{-1}$ (exposure from birth).

Inhalation Route:
The COPCs considered for carcinogenic effects from inhalation of indoor air are PCE and TCE, which have available inhalation SFs or inhalation unit risk (IUR) values. In the case of only an IUR being available, the IUR was converted to an SFi by dividing by an inhalation rate of 20 m^3/day and multiplying by an adult body weight of 70 kg. The SFi for each chemical is as follows: PCE = 2.1E-02 $[mg/kg\text{-}day]^{-1}$ and TCE = 7.0E-03 $[mg/kg\text{-}day]^{-1}$.

4.4 Summary Toxicity Profiles

This subsection summarizes the major toxicological effects of the chemicals that have been designated as COPCs for either groundwater or indoor air. This information is synthesized from toxicity information reviewed in the following sources:

- Agency for Toxic Substances and Disease Registry's (ATSDR) toxicological profiles
- EPA’s IRIS database
- National Center for Environmental Assessment (NCEA) issue papers

Based on the results of both the risk-based and regulatory screens, the only COPCs considered in these sections are PCE, TCE, and VC for groundwater ingestion (by users of groundwater from private wells not supplied with municipal water), and PCE and TCE for inhalation of indoor air due to vapor intrusion. More complete information on carcinogenic and non-carcinogenic effects of COPCs may be found in RAGS Tables 5 and 6 of **Appendix A**.

4.4.1 Tetrachloroethylene

High concentrations of tetrachloroethylene (particularly in closed, poorly ventilated areas) can cause dizziness, headache, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, and death. Irritation may result from repeated or extended skin contact. These symptoms occur almost entirely in work (or hobby) environments when people have been accidentally exposed to high concentrations or have intentionally used tetrachloroethylene to get a "high." In industry, most workers are exposed to levels lower than those causing obvious nervous system effects. The health effects of breathing in air or drinking water with low levels of tetrachloroethylene are not known. Results of animal studies, conducted with amounts much higher than those to which most people are exposed, show that tetrachloroethylene can cause liver and kidney damage (source of the RfDo). Exposure to very high levels of tetrachloroethylene can be toxic to the unborn pups of pregnant rats and mice. Changes in behavior were observed in the offspring of rats that breathed high levels of the chemical while they were pregnant.

The Department of Health and Human Services (DHHS) has determined that tetrachloroethylene may be reasonably anticipated to be a carcinogen. Tetrachloroethylene has been shown to cause liver tumors in mice and kidney tumors in male rats.

4.4.2 Trichloroethylene

Breathing small amounts of TCE may cause headaches, lung irritation, dizziness, poor coordination, and difficulty in concentration. Breathing TCE for long periods may cause nerve, kidney, and liver damage. Drinking TCE for long periods may cause liver and kidney damage, impaired immune system function, and impaired fetal development in pregnant women, although the extent of some of these effects is not yet clear. Skin contact with TCE for short periods may cause skin rashes.

Some studies with mice and rats have suggested that high levels of TCE may cause liver, kidney, or lung cancer. Some studies of people exposed over long periods to high levels of TCE in drinking water or in workplace air have found evidence of increased cancer. Although there are some concerns about the studies of people who were exposed to TCE, some of the effects found in people were similar to effects in animals. In its 9th Report on Carcinogens, the National Toxicology Program (NTP) determined that TCE is "reasonably anticipated to be a human carcinogen." The International Agency for Research on Cancer (IARC) has determined that TCE is "probably carcinogenic to humans."

Two inhalation slope factors are used for TCE in this BLRA: a low-end SFi from Cal-EPA, and a high-end SFi from the National Center for Environmental Assessment (NCEA).

4.4.3 Vinyl Chloride

Breathing high levels of VC can cause dizziness or drowsiness, and breathing very high levels can cause unconsciousness or even death. Some people who are repeatedly exposed to high levels of VC have developed changes in liver structure, nerve damage, and immune reactions. The lowest levels that produce these effects in people are not known. The effects of drinking high levels of VC are unknown. When in contact with the skin, it can cause numbness, redness, and blisters. Animal studies have shown that long-term exposure to VC can damage the sperm and testes, as well as cause changes in liver structure (source of the RfDo).

VC is a known carcinogen (Class A). Studies in workers who have breathed VC over many years showed an increased risk of liver cancer. Brain cancer, lung cancer, and some cancers of the blood also have been observed in workers.

5.0 Risk Characterization

5.1 Objective

The objective of the Risk Characterization is to integrate the information developed in the Exposure Assessment (**Section 3**) and the Toxicity Assessment (**Section 4**) into an evaluation of the potential current and potential future health risks associated with the COPCs in the shallow groundwater and indoor air. Risk characterization uses the information on the known toxic effects for contaminants and interprets them with the relevant exposures to determine what effects might be expected for the identified exposure levels, durations, and routes likely to occur.

5.2 Approaches to Evaluating Risk

5.2.1 Carcinogenic Risk

Carcinogenic risk is calculated by multiplying the estimated CDI that is averaged over a lifetime (lifetime-averaged dose) by a chemical and exposure-route-specific (i.e., oral or inhalation) cancer SF. The calculation of carcinogenic risk, which assumes a low dose, linear relationship, is illustrated by the following equation:

$$\text{Cancer Risk} = \text{CDI} \times \text{CSF}$$

where:

CDI = Chronic daily intake (intake averaged over a 70-year lifetime) (mg/kg-day)

CSF = Chemical and route-specific cancer SF $(\text{mg/kg-day})^{-1}$.

The linear equation is valid only at risk levels below estimated risks of 1E-02. The combined upper-bound cancer risk for a particular exposure route is then estimated by summing the risk estimates for all the COPCs for that route. This approach assumes independence of action by the chemicals (i.e., there are no synergistic or antagonistic interactions), and that all the chemicals have the same toxicological endpoint (i.e., cancer, regardless of target organ). The total upper-bound cancer risk to the receptor population is estimated by summing the combined cancer risks for all chemicals from all relevant potential exposure routes.

In assessing the carcinogenic risks posed by a site, the EPA (through the National Contingency Plan, NCP), establishes an excess cancer risk of 1E-06 as a "point of departure" for establishing remediation goals. Excess cancer risks lower than 1E-06 are not addressed by the NCP. Excess cancer risks in the range of 1E-06 to 1E-04 may or may not be considered acceptable, depending on site-specific factors such as the potential for exposure, technical limitations of remediation, and data uncertainties. Risks exceeding 1E-04, which are considered unacceptable, require action to reduce exposures.

Instead of requiring a BLRA, the TCEQ (through the TRRP rule, 30 TAC §350) requires development of control measures that apply PCLs to reduce risks to acceptable levels. The PCLs are initially calculated based on a target risk of 1E-05, but must be reduced to ensure that the cumulative cancer risk from exposure to all carcinogens is below 1E-04 [(30 TAC §350)(c)(1)].

5.2.2 Non-Carcinogenic Hazard

Non-carcinogenic health effects are evaluated by calculating a hazard quotient (HQ) and hazard index (HI). This is accomplished by dividing the CDIs of the COPCs, which are averaged over the exposure period, by chemical and route-specific RfDs. The HQ for a particular chemical is the ratio of the estimated CDI through a given exposure route to the applicable RfD. The HQ-RfD relationship is illustrated by the following equation:

$$HQ = CDI/RfD$$

where:

HQ	=	Hazard quotient (unitless)
CDI	=	Chronic daily intake (averaged over the exposure period) (mg/kg-day)
RfD	=	Reference dose (mg/kg-day)

The HQs quotients determined for each COPC by exposure route (i.e., oral, , or inhalation) are summed within an exposure scenario to obtain a total HI. The HI is an expression of the additivity of non-carcinogenic health effects. Additivity in response is generally only a valid assumption if different COPCs affect the same target organ or physiologically integrated systems. Because the RfDs determined for the multiple COPCs in a given exposure scenario usually represent a range of different target organs or systems, the calculated HI is considered conservative.

The methodology used to evaluate non-carcinogenic hazard, unlike the methodology used to evaluate carcinogenic risk, is not a measure of quantitative risk. The HQ or HI is not a mathematical prediction of the incidence or severity of those effects, but rather a relative indication of the likelihood of adverse health effects occurring. If an HQ or HI exceeds 1, there is a potential for adverse non-carcinogenic health effects occurring under the defined exposure conditions. It is important to note, however, that the derivation of individual RfDs incorporates a margin of safety through division by uncertainty factors sometimes spanning several orders of magnitude (**Section 4**), and the RfDs for multiple chemicals in a given exposure scenario can potentially represent a number of different toxic endpoints. Therefore, an HQ or HI greater than 1 does not necessarily indicate that an adverse non-carcinogenic effect will occur. An HI less than or equal to one indicates that it is unlikely for even sensitive populations to experience adverse non-carcinogenic health effects.

5.3 Summary of Results

RAGS Table 7 (**Appendix A**) presents summaries of cancer risk and non-cancer hazard to receptors due to contact with COPCs in groundwater, as well as inhalation of indoor air due to vapor intrusion. As the RME scenario is used as the basis for decision at the site, only RME results are presented; however, CTE would be expected to be less.

These risk results for inhalation of indoor air are not modeled, but are based on direct measurements of indoor air. As such, they do not account for any possible background sources of VOCs.

5.3.1 Carcinogenic Risk Results

Groundwater: Estimated risk from ingestion of groundwater was calculated for the adult and child resident, and the adult worker. Carcinogenic risk from exposure to groundwater is presented as a range, due to the use of two SFs for vinyl chloride to characterize exposures during adulthood (adult risk) and continuous exposures from birth based on the ages at which exposure would theoretically begin.

Estimated cancer risk for the adult resident hypothetically exposed to groundwater (that is not from a municipal supplier) ranged from 3.9E-05 to 4.8E-05 (**Table 7.1.1**), which reflects the contributions of two risk estimates for exposure to vinyl chloride. This range is within the acceptable range of 1E-06 to 1E-04 described in the NCP.

These risk estimates apply to users of water from those private wells that are not anticipated to receive municipal drinking water. The TCEQ requires that all groundwater sources considered in this BLRA must have COPC concentrations below the MCL before they are considered acceptable as a drinking water source. The municipal groundwater that will be supplied under the approved control measure will have COPC concentrations below MCL values as required by the Safe Drinking Water Act.

Indoor Air: Estimated risk from inhalation of indoor air was calculated for the adult and child resident, and the adult worker. Estimated cancer risk for the hypothetical resident at the Center Room location was 4.5E-05 (**Table 7.2.1**). Estimated cancer risk for the hypothetical indoor worker at the Center Room location was 1.4E-05 (**Table 7.2.3**). All cancer risk estimates for inhalation to indoor vapors are within the acceptable range of 1E-06 to 1E-04 described in the NCP.

5.3.2 Non-Carcinogenic Hazard Results

Groundwater: Estimated noncancer hazard from ingestion of groundwater was calculated for the adult and child resident. Estimated hazard index (HI) for the adult resident hypothetically exposed to groundwater (that is not from a municipal supplier) is 7.1E-02 (**Table 7.1.1**). The estimated HI for the child resident is 1.8E-01 (**Table 7.2.1**). These estimates for noncancer hazard to residents are below the acceptable HI value of 1 described in the NCP.

Indoor Air: Hazard from inhalation of indoor air was calculated for adult and child residents, and the adult worker. Estimated noncancer HI for the hypothetical adult resident at the Center Room location was 8.0E-02 (**Table 7.2.1**). For the child resident, inhalation HI was estimated as 8.1E-02 (**Table 7.2.2**). The estimated noncancer hazard for the hypothetical indoor worker at the Center Room location was 3.7E-02 (**Table 7.2.3**). These values are below the acceptable HI value of 1 described in the NCP. Uncertainties associated with these risk estimates arise from use of indoor air measurements at two indoor locations selected at the maximum known soil and groundwater concentrations where the releases occurred. These uncertainties are expected to result in an overestimation of risk from indoor air exposure as described in **Section 6.2**. Risks associated with vapor concentrations near lower soil and groundwater concentrations will be lower.

5.4 Summary and Conclusions

Results of the BLRA show that:

- Chemicals identified as COPCs in groundwater from wells that are not anticipated to receive municipal drinking water (PCE, TCE and VC) do not represent unacceptable cancer risk or noncancer hazard to residents or workers from groundwater ingestion. As such, they would not be identified as COCs for remediation based on this risk assessment.

- Concentrations of these chemicals in water taken from several of the above private wells since 2002 exceed MCL values specified in the SDWA (**Tables 2-1** through **2-5**). Therefore, these chemicals present an unacceptable risk to human health and the environment. This approach is based on OSWER Directive 9355.0-30, *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions*, (EPA, 1991a), which states that MCLs may be used to determine whether an exposure is associated with an unacceptable risk to human health or the environment and whether remedial action is warranted.

- Chemicals identified as COPCs based on indoor air measurements (PCE and TCE) do not represent unacceptable cancer risk or noncancer hazard to hypothetical residents or to workers at the site. As such, they would not be identified as COCs based on this risk assessment.

6.0 Uncertainties

6.1 Objective

The objective of the evaluation and discussion of uncertainties is to provide a context for interpretation of the risk characterization results. To evaluate the kinds of risks that might be expected as a result of exposure to environmental contaminants, it is necessary to determine the source and levels of contaminants, to identify the potentially complete exposure pathways, how much exposure that will occur for each, and the level of toxicity expected from that level of toxicant exposure. Most frequently, it is necessary to make assumptions about all of these factors, which introduces uncertainties into the risk estimates.

The sources of uncertainties, and their potential to result in over estimation or under estimation of risk, can usually be identified and evaluated qualitatively.

At least three sources of uncertainty exist in the Jones Road site BLRA:

- Uncertainty in environmental data
- Uncertainty in exposure assumptions
- Uncertainty related to toxicity assumptions

The following sections will discuss the potential impacts on the risk characterization from each of these sources of uncertainties.

6.2 Uncertainty in Environmental Data

To determine concentrations of contaminants in environmental media, and to determine the full extent of site-related contaminants, requires collecting and interpreting analytical data based on a sampling plan. The sampling plan is derived by using what is known of the site operations and related chemicals, soil types, and hydrogeology, to select a sampling strategy likely to provide the most information. Because groundwater sampling has been conducted quarterly since 2002 at the Jones Road site, sufficient data are available to characterize the shallow and deeper groundwater-bearing zones, and to capture uncertainties related to water level fluctuations and other seasonal variations that could affect contaminant concentrations.

Groundwater data used in the BLRA were collected from private water wells at locations not anticipated to receive municipal drinking water, and TCEQ monitor wells screened at depths in the same groundwater zone. Because of the number of wells sampled (231), and the availability of data from quarterly sampling over 18 months, seasonal variability is assumed to be reflected in the data. Use of the maximum concentration of each chemical measured in any well within the 18 month period to screen chemicals for further evaluation provides a conservative identification of a higher number of COPCs. Similarly, use of the 95% UCL of the mean concentration of each chemical provides a conservative estimate of exposure concentrations that incorporate the variability contained in the data.

Because this approach to data evaluation is designed to bias the COPC identification toward more chemicals and their assessment at higher concentrations, it is expected that resulting exposures and risks are conservatively overestimated.

Indoor air concentrations were based on single measurements of detected values. These values are not expected to represent stable estimates of concentrations over time. The indoor samples were taken at locations of maximum known groundwater contamination to provide a high bias to indoor air concentration measurements. Additionally, the BLRA considers all measured concentrations of chlorinated solvents as vapor intrusion from groundwater sources, and the exposure assessment was based on the maximum measured concentration of each chemical. Because no correction was made to the measurements to remove other likely indoor sources of chlorinated solvents, this assumption is expected to overestimate the actual contribution from vapor intrusion. This application of indoor air measurements is expected to result in over estimations of exposure.

6.3 Uncertainty in Exposure Assumptions

A number of uncertainties are associated with assumptions made in the exposure assessment. Areas of uncertainty include the calculation of intakes and the selection of exposure parameters. Uncertainties regarding exposure assumptions result from the variability of the different parameters such as ingestion rates and exposure durations both within and across populations. Best estimates from data sources compiled by regulatory agencies were used in assessing potential exposures. The values used for exposure frequency and duration factors are expected to over estimate exposure, although how well these assumptions fit the receptor population is unknown.

The composition of the groundwater plume and indoor air was assumed to be constant for the duration of exposures (30 years for residential exposures). In fact, changes are expected to occur over time with distance from the source and with degradation of PCE into its breakdown products, which increase in relative concentration. This uncertainty could result in either an over- or underestimation of risk.

6.4 Toxicity Assumptions

Assumptions of toxicity at expected exposure doses were based on unit exposure values determined by regulatory agencies. Because of uncertainties in the studies used in determining toxicity (**Section 4**), single to multiple order-of-magnitude adjustments are made in the process of determining safe exposure levels. Therefore, it is anticipated that the values will tend to overestimate expected toxicity at a given level of exposure.

Multiple chlorinated solvents may act on similar target organs and systems to produce similar toxic responses, and additivity of responses is assumed. Data are not available for these COPCs to quantify synergistic or antagonistic effects. If these chemicals exhibit synergistic effects, risk estimates would be underestimated. This potential is somewhat balanced by use of maximum or RME chemical concentrations in the assessment.

Finally, although there may be sensitive subsets of the population at the site, the toxicity reference values incorporate uncertainty factors that are designed to protective of these sensitive subpopulations. Combined with the RME exposure assumptions, the net result of the evaluation should be protective of those members of the population.

7.0 Ecological Assessment

The objective of the ecological assessment is to evaluate potential effects on ecological receptors resulting from the chemicals identified in environmental media at the Jones Road site. The ecological evaluation used the Tier 1 Ecological Criteria Checklist described in the TRRP (30 TAC §350). The evaluation indicates that no further action is necessary to protect ecological receptors at the site (**Appendix B**).

8.0 Section 8

8.1 References

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Figures

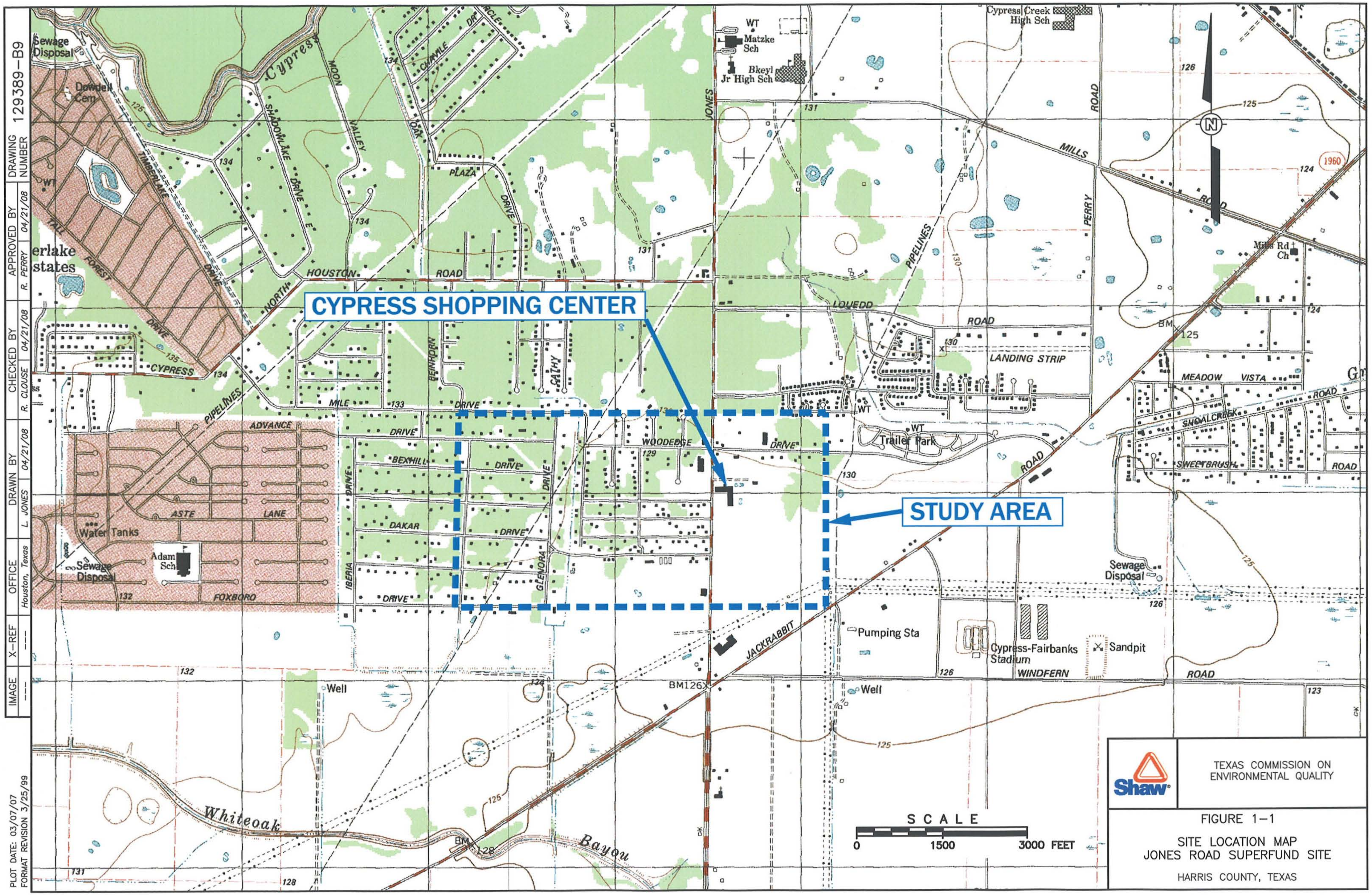
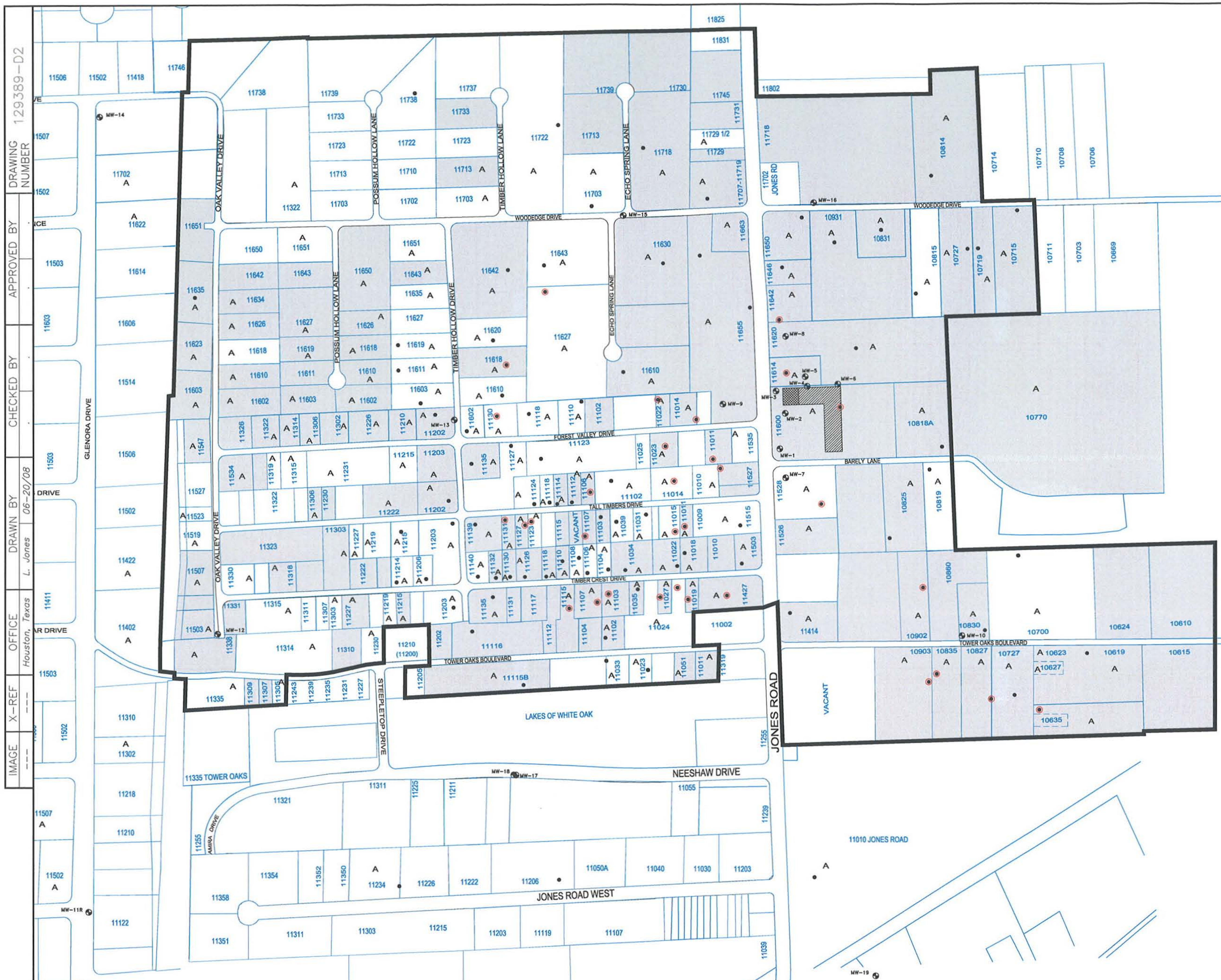


FIGURE 1–1

SITE LOCATION MAP
JONES ROAD SUPERFUND SITE

HARRIS COUNTY, TEXAS



EXPLANATION:

- PROPERTY BOUNDARY
- FINAL WATERLINE SERVICE AREA BOUNDARY
- MONITOR WELL LOCATION
- APPROXIMATE PRIVATE WELL LOCATION
- FILTRATION SYSTEM
- A ACCESS AGREEMENT
- SIGNED AGREEMENT RECEIVED BY TCEQ AS OF 01/01/08
- LOCATION OF STRIP CENTER (CYPRESS SHOPING CENTER)
- LOCATION OF FORMER BELL DRY CLEANERS

NOTE: MAP IS SUBJECT TO CHANGE DUE TO PROPERTY TRANSACTIONS.

N

SCALE
0 200 400 800 FEET

Prepared for:

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Shaw

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

FIGURE 1-2
GROUNDWATER WELL LOCATION MAP
JONES ROAD SUPERFUND SITE
AS OF 1/1/08
HARRIS COUNTY, TEXAS

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Tables

Table 2-1

Concentration of Tetrachloroethylene (PCE) in Groundwater from Private Wells and Monitoring Wells

Jones Road Superfund Site
Houston, Texas

	Aug. '05		Nov. '05		Feb. '06		May/ Jul. '06		Aug. '06		Nov. '06		Feb. '07		May '07		Aug. '07		Nov. '07	
Location ID	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual
AD11502	NS		0.5	U	NS		0.5	U	NS		NS		NS		0.5	U	NS		0.5	U
AD11511	NS		NS		NS		NS		0.5	U	NS		NS		NS		1	U	NS	
AD11603	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		NS		NS	
AD11619	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
AD11702	NS		NS		NS		0.5	U	NS		NS		NS		0.5	U	1	U	NS	
AD11714	NS		NS		NS		NS		0.5	U	NS		NS		NS		1	U	NS	
BH11603	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		NS		0.5	U
BH11614	NS		0.5	U	NS		0.5	U	0.5	U	NS		NS		0.5	U	1	U	NS	
BH11710	NS		0.5	U	NS		NS		NS		NS		NS		NS		NS		NS	
BL10819	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.069	LJ	0.5	U	1	U	0.071	LJ
CP11510	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
CP11610	NS		NS		NS		0.5	U	NS		NS		NS		0.5	U	NS		NS	
CP11710	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		NS		0.5	U
CP11711	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		1	U	NS	
CP11718	0.5	U	0.5	U	0.5	U	NS		0.5	U	NS		NS		NS		NS		NS	
DK11503	NS		NS		NS		0.5	U	NS		NS		NS		NS		NS		NS	
DK11603	NS		NS		NS		NS		NS		NS		NS		NS		NS		0.5	U
DK11611	NS		0.5	U	NS		NS		0.5	U	NS		NS		NS		1	U	NS	
DK11702	NS		NS		NS		0.5	U	NS		NS		NS		0.5	U	NS		NS	
DK11703	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		NS		NS	
DK11707	NS		NS		NS		NS		NS		NS		NS		0.5	U	NS		NS	
DK11710	NS		0.5	U	NS		NS		NS		NS		NS		NS		NS		NS	
DK11718	NS		NS		NS		NS		0.5	U	NS		NS		NS		1	U	NS	
DM11502	NS		NS		NS		NS		0.5	U	NS		NS		NS		NS		NS	
DM11506	NS		0.5	U	NS		0.5	U	NS		NS		NS		0.5	U	1	U	NS	
DM11507	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		1	U	NS	
DM11513	NS		NS		NS		NS		0.5	U	NS		NS		NS		NS		0.5	U
DM11515	NS		NS		NS		0.5	U	NS		NS		NS		0.5	U	1	U	NS	
ES11627	2.7		1.1		3.1		3.3		2.4		4.2		7.1		6		4		2.9	
ES11643	0.84		0.86		0.55		0.76		0.56		0.5		0.41	LJ	0.59		0.95		1.3	
ES11703	0.11	LJ	0.5	U	0.5	U	0.44	LJ	NS		NS		NS		NS		NS		0.5	U
FB11502	0.5	U	NS		NS		NS		NS		NS		NS		NS		0.5	U	NS	
FB11607	NS		0.5	U	NS		NS		NS		NS		NS		NS		NS		NS	
FB11610	NS		NS		0.5	U	NS		NS		NS		NS		NS		NS		NS	
FB11614	NS		0.5	U	NS		NS		0.5	U	NS		NS		NS		NS		0.5	U
FV11110	0.57		0.46	LJ	0.33		0.47	LJ	0.5	U	0.32	LJ	0.35	LJ	0.5	U	0.39	LJ	0.23	LJ
FV11118	0.076	LJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.069	LJ	0.5	U	0.5	U	0.1	LJ
FV11123	0.16	LJ	0.15	LJ	0.5	U	0.19	LJ	0.5	U	0.1	LJ	0.13	LJ	0.5	U	0.5	U	0.12	LJ
FV11127	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11130	5		7.9		3.7		9.9		11		14.6		17.5		31.6		36.6		40.4	
FV11215	0.5	U	0.5	U	0.5	U	0.16	LJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11231	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U
FV11315	0.5	U	0.5	U	0.5	U	0.26	LJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11319	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11310	0.5	U	NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11402	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11506	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11514	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11606	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11614	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11622	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11702	0.5	U	0.5	U	0.5	U	NS		NS		NS		NS		NS		NS		NS	
JR11010	0.14	LJ	0.5	U	0.18	LJ	0.5	U	0.5	U	0.13	LJ	0.5	U	0.5	U	1	U	0.28	LJ
JR11043	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.083	LJ	0.5	U	1	U	0.14	
JR11515	1.2	U	NS		NS		NS		NS		NS		NS		NS		NS		NS	
JR11528	2.9	U	3.6	J	6		3.4	J	3.1		4.3		4.5		3.9		6.6		9.6	
JR11535	64		57		67		50		71		67.4	J	84.7		75.1		85.5		83.9	
JR117291/2	0.5	U	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U	1	U	0.5	U
JRW11234	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

Table 2-1

Concentration of Tetrachloroethylene (PCE) in Groundwater from Private Wells and Monitoring Wells

Jones Road Superfund Site
Houston, Texas

	Aug. '05		Nov. '05		Feb. '06		May/ Jul. '06		Aug. '06		Nov. '06		Feb. '07		May '07		Aug. '07		Nov. '07	
Location ID	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual
MI11507	NS		NS		NS		NS		NS		0.5	U	0.5	U	NS		0.5	U	NS	
MI11510	NS		NS		NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS	
MI11515	NS		NS		NS		NS		NS		NS		NS		NS		NS		0.5	U
MI11611	NS		0.5	U	NS		NS		0.5	U	NS		NS		0.5	U	NS		0.5	U
OV11618	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
PH11651	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS		NS		NS		NS	
PH11702	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
PH11710	NS		NS		0.5	U	NS		NS		NS		NS		NS		NS		NS	
PH11738	NS		NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
PH11739	NS		NS		NS		0.5	U	0.5	U	NS		NS		NS		NS		NS	
TC11106	4.4		4		4		3		3.1		2.9		NS		2.4		2.6		3.3	
TC11108	3		NS		NS		NS		NS		NS		3.5		NS		NS		NS	
TC11140	0.3	J	0.38	J	0.29	LJ	0.38	LJ	0.4	LJ	0.47	LJ	0.44	LJ	0.5	U	0.53		0.61	
TC11206	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TC11214	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS		NS		0.5	U	0.5	U	0.5	U
TC11219	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TC11315	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TC11330	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11602	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11603	0.5	U	0.5	U	0.5	U	0.64		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11611	0.32	J	0.36	J	0.66		0.5	U	0.57		1.1		0.85		0.85		0.91		0.84	
TH11620	0.19	J	0.15	J	0.21	LJ	0.11	LJ	0.5	U	0.5	U	0.056	LJ	0.5	U	0.5	U	0.071	LJ
TH11627	NS		NS		NS		0.5	U	NS		NS		NS		NS		NS		NS	
TH11635	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11703	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
TH11722	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
TH11723	0.5	U	0.5	U	7.8	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11737	NS		NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
TO10700	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
TO10700LPT	NS		NS		NS		NS		NS		0.5	U	0.5	U	0.5	U	1	U	0.5	U
TO11023	0.76		0.55		0.35	LJ	0.6		0.5	U	0.56		1.5		1.4		1.7		2.1	
TO11024	32		33		42		25		NS		NS		NS		NS		NS		NS	
TO11033	NS		1.9		2.1		2.7		3.9		3.7		4.2		4.2		4		2.8	
TO11205	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TO11230	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS	
TO11305	0.5	U	0.5	U	0.5	U	NS		NS		NS		NS		NS		NS		NS	
TT11014	32		0.5	U	57	J	51		26		31.6		99.6		106		95.2		110	
TT11015	28		30		38		42		28		32.6		36.8		27.3		23.1		28	
TT11031	9.2		15		14		13		7.6		11.9		10.5		13		9.3		NS	
TT11039	2.7		3.6		1.9		NS		NS		NS		NS		NS		NS		NS	
TT11102	1.3		1.5		1.3		0.5		0.76		0.64		0.26	LJ	0.28	LJ	0.22	LJ	0.22	LJ
TT11118	1.7		NS		NS		NS		NS		NS		NS		NS		NS		NS	
TT11123	8.1		6.8		6		NS		4.1		3.7		NS		NS		NS		11	
TT11124	0.33	J	0.42	J	0.47	LJ	0.37	LJ	0.5	U	0.35	LJ	0.32	LJ	0.5	U	0.38	LJ	0.44	
TT11203	0.16	J	0.18	J	0.5	U	0.5	U	0.5	U	0.17	LJ	0.18	LJ	NS		NS		NS	
TT11215	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TT11322	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
WE10710	NS		NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
WE10711	NS		NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
WE10815	NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
Deep Monitor Wells																				
MW-11R	NS		0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
MW-14	10	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
MW-17	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
MW-18	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.29	LJ
MW-19	NS		0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
Maximum and Minimum Concentrations of Tetrachloroethylene (PCE) in Groundwater Wells																				
Maximum PCE Concentration (bold value indicates maximum of all samples)	64		57		67		51		71		67.4		99.6		106		95.2		**110**	
Minimum PCE Concentration (bold value indicates minimum of all samples)	0.076	LJ	0.15	LJ	0.18	LJ	0.11	LJ	0.4	LJ	0.1	LJ	**0.056**	LJ	0.28	LJ	0.22	LJ	0.071	LJ

Notes:

PCE concentration <= 0.5 ppb (Quantitation Limit)

PCE concentration >0.5 to <= 5.0 ppb

PCE concentration > 5.0 ppb (MCL)

J: Estimated value above detection limit and below quantitation limit

L: Value contains low bias

NS: Well not sampled

U: Undetected, value below detection limit

014636

Table 2-1

Concentration of Tetrachloroethylene (PCE) in Groundwater from Private Wells and Monitoring Wells

Jones Road Superfund Site
Houston, Texas

Location ID	Aug. '05		Nov. '05		Feb. '06		May/ Jul. '06		Aug. '06		Nov. '06		Feb. '07		May '07		Aug. '07		Nov. '07	
	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual

Key to Figure 1-2

Location Code	Street Name
AD	Advance Drive
BH	Bexhill
BL	Barely Lane
CP	Campos Drive
DK	Dakar Drive
DM	Dermott Drive
ES	Echo Spring Lane
FB	Foxboro Drive
FV	Forest Valley Drive
GL	Glenora Drive
JR	Jones Road
JRW	Jones Road West
MI	Mile Drive
OV	Oak Valley Drive
PH	Possum Hollow Lane
TC	Timber Crest Boulevard
TH	Timber Hollow
TO	Tower Oaks Blvd
TT	Tall Timbers Drive
WE	Woodedge Drive

Example: Location JR11535 in the table indicates 11535 Jones Road in Figure 1-2

Table 2-2

Concentration of Trichloroethylene (TCE) in Groundwater from Private Wells and Monitor Wells

Jones Road Superfund Site
Houston, Texas

	Aug. '05		Nov. '05		Feb. '06		May/ Jul. '06		Aug. '06		Nov. '06		Feb. '07		May '07		Aug. '07		Nov. '07	
Location ID	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual
AD11502	NS		0.5	U	NS		0.5	U	NS		NS		NS		0.5	U	NS		0.5	U
AD11511	NS		NS		NS		NS		0.5	U	NS		NS		NS		1	U	NS	
AD11603	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		NS		NS	
AD11619	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
AD11702	NS		NS		NS		0.5	U	NS		NS		NS		0.5	U	1	U	NS	
AD11714	NS		NS		NS		NS		0.5	U	NS		NS		NS		1	U	NS	
BH11603	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		NS		0.5	U
BH11614	NS		0.5	U	NS		0.5	U	0.5	U	NS		NS		0.5	U	1	U	NS	
BH11710	NS		0.5	U	NS		NS		NS		NS		NS		NS		NS		NS	
BL10819	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
CP11510	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
CP11610	NS		NS		NS		0.5	U	NS		NS		NS		0.5	U	NS		NS	
CP11710	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		NS		0.5	U
CP11711	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		1	U	NS	
CP11718	0.5	U	0.5	U	0.5	U	NS		0.5	U	NS		NS		NS		NS		NS	
DK11503	NS		NS		NS		0.5	U	NS		NS		NS		NS		NS		NS	
DK11603	NS		NS		NS		NS		NS		NS		NS		NS		NS		0.5	U
DK11611	NS		0.5	U	NS		NS		0.5	U	NS		NS		NS		1	U	NS	
DK11702	NS		NS		NS		0.5	U	NS		NS		NS		0.5	U	NS		NS	
DK11703	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		NS		NS	
DK11707	NS		NS		NS		NS		NS		NS		NS		0.5	U	NS		NS	
DK11710	NS		0.5	U	NS		NS		NS		NS		NS		NS		NS		NS	
DK11718	NS		NS		NS		NS		0.5	U	NS		NS		NS		1	U	NS	
DM11502	NS		NS		NS		NS		0.5	U	NS		NS		NS		NS		NS	
DM11506	NS		0.5	U	NS		0.5	U	NS		NS		NS		0.5	U	1	U	NS	
DM11507	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		1	U	NS	
DM11513	NS		NS		NS		NS		0.5	U	NS		NS		NS		NS		0.5	U
DM11515	NS		NS		NS		0.5	U	NS		NS		NS		0.5	U	1	U	NS	
ES11627	0.18	LJ	0.08	LJ	0.17	LJ	0.25	LJ	0.5	U	1	U	1	U	1	U	1	U	0.058	LJ
ES11643	0.5	U	0.07	LJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.093	LJ
ES11703	0.5	U	0.5	U	0.5	U	0.5	U	NS		NS		NS		NS		NS		0.5	U
FB11502	0.5	U	NS		NS		NS		NS		NS		NS		NS		0.5	U	NS	
FB11607	NS		0.5	U	NS		NS		NS		NS		NS		NS		NS		NS	
FB11610	NS		NS		0.5	U	NS		NS		NS		NS		NS		NS		NS	
FB11614	NS		0.5	U	NS		NS		0.5	U	NS		NS		NS		NS		0.5	U
FV11110	0.063	LJ	0.053	LJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11118	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11123	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11127	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11130	0.3	LJ	0.48	LJ	0.21	LJ	0.59		0.52	U	1	U	1	U	1.6	U	1.8	U	2.1	U
FV11215	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11231	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U
FV11315	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11319	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11310	0.5		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11402	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11506	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11514	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11606	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11614	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11622	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11702	0.5	U	0.5	U	0.5	U	NS		NS		NS		NS		NS		NS		NS	
JR11010	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
JR11043	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
JR11515	5.7		NS		NS		NS		NS		NS		NS		NS		NS		NS	
JR11528	0.22	LJ	0.15		0.4	LJ	0.21	LJ	0.5	U	0.5	U	1	U	1	U	1	U	0.45	LJ
JR11535	1.8		1.6		1.7		1.7		1.6		2.6		2.6		3.9		4.8		2.5	
JR117291/2	0.5	U	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U	1	U	0.5	U
JRW11234	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

Table 2-2

Concentration of Trichloroethylene (TCE) in Groundwater from Private Wells and Monitor Wells

Jones Road Superfund Site
Houston, Texas

Location ID	Aug. '05		Nov. '05		Feb. '06		May/ Jul. '06		Aug. '06		Nov. '06		Feb. '07		May '07		Aug. '07		Nov. '07	
	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual
MI11507	NS		NS		NS		NS		NS		0.5	U	0.5	U	NS		0.5	U	NS	
MI11510	NS		NS		NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS	
MI11515	NS		NS		NS		NS		NS		NS		NS		NS		NS		0.5	U
MI11611	NS		0.04	LJ	NS		NS		0.5	U	NS		NS		0.5	U	NS		0.5	U
OV11618	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
PH11651	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS		NS		NS		NS	
PH11702	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
PH11710	NS		NS		0.5	U	NS		NS		NS		NS		NS		NS		NS	
PH11738	NS		NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
PH11739	NS		NS		NS		0.5	U	0.5	U	NS		NS		NS		NS		NS	
TC11106	0.27	LJ	0.26	LJ	0.25	LJ	0.27	LJ	0.5	U	0.5	U	NS		0.17	LJ	0.5	U	0.17	LJ
TC11108	0.2	LJ	NS		NS		NS		NS		NS		0.24	LJ	NS		NS		NS	
TC11140	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TC11206	0.11	LJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.05	LJ
TC11214	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS		NS		0.5	U	0.5	U	0.5	U
TC11219	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TC11315	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TC11330	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11602	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11603	0.5	U	0.5	U	0.5	U	0.04	LJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11611	0.5	U	0.04	LJ	0.5	U	0.5	U	0.5	U	0.5	U	0.056	LJ	0.5	U	0.5	U	0.5	U
TH11620	0.5	U	0.04	LJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11627	NS		NS		NS		0.5	U	NS		NS		NS		NS		NS		NS	
TH11635	0.5	U	0.5	U	0.5	U	0.64		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11703	0.5	U	0.5	U	0.5	U	0.64		0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
TH11722	0.5	U	0.5	U	0.5	U	0.64		0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
TH11723	0.5	U	0.5	U	0.49	LJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11737	NS		NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
TO10700	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
TO10700LPT	NS		NS		NS		NS		NS		0.5	U	0.5	U	0.5	U	1	U	0.5	U
TO11023	0.16	LJ	0.06	LJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.13	LJ
TO11024	1.7		2.5		2.3		1.5		NS		NS		NS		NS		NS		NS	
TO11033	NS		0.14	LJ	0.14	LJ	0.17	LJ	0.5	U	0.24	LJ	0.28	LJ	0.25	LJ	1	U	0.18	LJ
TO11205	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TO11230	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS	
TO11305	0.11	LJ	0.5	U	0.5	U	NS		NS		NS		NS		NS		NS		NS	
TT11014	1.8		0.5	U	3.4		2.8	J	1.4		1.8	J	5.4		5.5		5.1		4.9	
TT11015	2.3		2.2		2.5		2.7		1.7		2.2		2.2		1.8		1.5		1.7	
TT11031	0.62		1	U	0.87		0.83		0.5	U	1	U	1	U	1	U	1	U	NS	
TT11039	0.2		0.5	U	0.11	LJ	NS		NS		NS		NS		NS		NS		NS	
TT11102	0.11	LJ	0.12	LJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TT11118	0.11	LJ	NS		NS		NS		NS		NS		NS		NS		NS		NS	
TT11123	0.49	LJ	0.43	LJ	0.36	LJ	NS		0.5	U	1	U	NS		NS		NS		0.49	LJ
TT11124	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TT11203	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS		NS		NS	
TT11215	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TT11322	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
WE10710	NS		NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
WE10711	NS		NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
WE10815	NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
Deep Monitor Wells																				
MW-11R	NS		0.33	LJ	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
MW-14	10	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
MW-17	0.5	U	0.03		0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
MW-18	0.5	U	0.06	LJ	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.29	LJ
MW-19	NS		0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
Maximum and Minimum Concentrations of Trichloroethylene (TCE) in Groundwater Wells																				
Maximum TCE Concentration (bold value indicates maximum of all samples)	**10**		2.5		3.4		2.8		1.7		2.6		5.4		5.5		5.1		4.9	
Minimum TCE Concentration (bold value indicates minimum of all samples)	0.063	LJ	**0.03**	LJ	0.11	LJ	0.04	LJ	0.5		0.24	LJ	0.056	LJ	0.17	LJ	0.5		0.05	LJ

Notes:

TCE concentration <= 0.5 ppb (Quantitation Limit)

TCE concentration >0.5 to <= 5.0 ppb

TCE concentration > 5.0 ppb (MCL)

J: Estimated value above detection limit and below quantitation limit

L: Value contains low bias

NS: Well not sampled

U: Undetected, value below detection limit

Table 2-2

Concentration of Trichloroethylene (TCE) in Groundwater from Private Wells and Monitor Wells

Jones Road Superfund Site
Houston, Texas

	Aug. '05		Nov. '05		Feb. '06		May/ Jul. '06		Aug. '06		Nov. '06		Feb. '07		May '07		Aug. '07		Nov. '07	
Location ID	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual

Key to Figure 1-2	
Location Code	Street Name
AD	Advance Drive
BH	Bexhill
BL	Barely Lane
CP	Campos Drive
DK	Dakar Drive
DM	Dermott Drive
ES	Echo Spring Lane
FB	Foxboro Drive
FV	Forest Valley Drive
GL	Glenora Drive
JR	Jones Road
JRW	Jones Road West
MI	Mile Drive
OV	Oak Valley Drive
PH	Possum Hollow Lane
TC	Timber Crest Boulevard
TH	Timber Hollow
TO	Tower Oaks Blvd
TT	Tall Timbers Drive
WE	Woodedge Drive

Example: Location JR11535 in the table indicates 11535 Jones Road in Figure 1-2

Table 2-3

Concentration of cis-1,2-Dichloroethylene (cis-1,2-DCE) in Groundwater from Private Wells and Monitor Wells

Jones Road Superfund Site
Houston, Texas

	Aug. '05		Nov. '05		Feb. '06		May/ Jul. '06		Aug. '06		Nov. '06		Feb. '07		May '07		Aug. '07		Nov. '07	
Location ID	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual
AD11502	NS		0.5	U	NS		0.5	U	NS		NS		NS		0.5	U	NS		0.5	U
AD11511	NS		NS		NS		NS		0.5	U	NS		NS		NS		1	U	NS	
AD11603	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		NS		NS	
AD11619	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
AD11702	NS		NS		NS		0.5	U	NS		NS		NS		0.5	U	1	U	NS	
AD11714	NS		NS		NS		NS		0.5	U	NS		NS		NS		1	U	NS	
BH11603	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		NS		0.5	U
BH11614	NS		0.5	U	NS		0.5	U	0.5	U	NS		NS		0.5	U	1	U	NS	
BH11710	NS		0.5	U	NS		NS		NS		NS		NS		NS		NS		NS	
BL10819	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
CP11510	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
CP11610	NS		NS		NS		0.5	U	NS		NS		NS		0.5	U	NS		NS	
CP11710	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		NS		0.5	U
CP11711	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		1	U	NS	
CP11718	0.5	U	0.5	U	0.5	U	NS		0.5	U	NS		NS		NS		NS		NS	
DK11503	NS		NS		NS		0.5	U	NS		NS		NS		NS		NS		NS	
DK11603	NS		NS		NS		NS		NS		NS		NS		NS		NS		0.5	U
DK11611	NS		0.5	U	NS		NS		0.5	U	NS		NS		NS		1	U	NS	
DK11702	NS		NS		NS		0.5	U	NS		NS		NS		0.5	U	NS		NS	
DK11703	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		NS		NS	
DK11707	NS		NS		NS		NS		NS		NS		NS		0.5	U	NS		NS	
DK11710	NS		0.5	U	NS		NS		NS		NS		NS		NS		NS		NS	
DK11718	NS		NS		NS		NS		0.5	U	NS		NS		NS		1	U	NS	
DM11502	NS		NS		NS		NS		0.5	U	NS		NS		NS		NS		NS	
DM11506	NS		0.5	U	NS		0.5	U	NS		NS		NS		0.5	U	1	U	NS	
DM11507	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		1	U	NS	
DM11513	NS		NS		NS		NS		0.5	U	NS		NS		NS		NS		0.5	U
DM11515	NS		NS		NS		0.5	U	NS		NS		NS		0.5	U	1	U	NS	
ES11627	0.41	LJ	0.5	U	0.43	LJ	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
ES11643	0.5	U	0.13	LJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.22	LJ	0.22	LJ
ES11703	0.5	U	0.5	U	0.5	U	0.5	U	NS		NS		NS		NS		NS		0.5	U
FB11502	0.5	U	NS		NS		NS		NS		NS		NS		NS		0.5	U	NS	
FB11607	NS		0.5	U	NS		NS		NS		NS		NS		NS		NS		NS	
FB11610	NS		NS		0.5	U	NS		NS		NS		NS		NS		NS		NS	
FB11614	NS		0.5	U	NS		NS		0.5	U	NS		NS		NS		NS		0.5	U
FV11110	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11118	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11123	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11127	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11130	0.77		1.2		0.55		1.5		1.5		1.9		2.1		3.5		4.3		5.2	
FV11215	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11231	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U
FV11315	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11319	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11310	0.5	U	NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11402	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11506	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11514	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11606	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11614	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11622	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11702	0.5	U	0.5	U	0.5	U	NS		NS		NS		NS		NS		NS		NS	
JR11010	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.056	LJ
JR11043	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
JR11515	0.36		NS		NS		NS		NS		NS		NS		NS		NS		NS	
JR11528	0.57		0.33		1.2		0.45	LJ	0.61		0.49	LJ	1		1		1		1.3	
JR11535	4.4		4.4		4.3		4.7		4.8		5.5		5.8		5.8		21		6.3	
JR117291/2	0.5	U	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U	1		0.5	U
JRW11234	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

Table 2-3

Concentration of cis-1,2-Dichloroethylene (cis-1,2-DCE) in Groundwater from Private Wells and Monitor Wells

Jones Road Superfund Site
Houston, Texas

	Aug. '05		Nov. '05		Feb. '06		May/ Jul. '06		Aug. '06		Nov. '06		Feb. '07		May '07		Aug. '07		Nov. '07	
Location ID	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual
MI11507	NS		NS		NS		NS		NS		0.5	U	0.5	U	NS		0.5	U	NS	
MI11510	NS		NS		NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS	
MI11515	NS		NS		NS		NS		NS		NS		NS		NS		NS		0.5	U
MI11611	NS		0.5	U	NS		NS		0.5	U	NS		NS		0.5	U	NS		0.5	U
OV11618	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
PH11651	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS		NS		NS		NS	
PH11702	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
PH11710	NS		NS		0.5	U	NS		NS		NS		NS		NS		NS		NS	
PH11738	NS		NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
PH11739	NS		NS		NS		0.5	U	0.5	U	NS		NS		NS		NS		NS	
TC11106	0.8		0.7		0.72		0.65		0.5	U	0.6		NS		0.44	LJ	0.56		0.49	LJ
TC11108	0.57		NS		NS		NS		NS		NS		0.54		NS		NS		NS	
TC11140	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TC11206	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TC11214	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS		NS		0.5	U	0.5	U	0.5	U
TC11219	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TC11315	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TC11330	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11602	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11603	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11611	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.18	LJ	0.14	LJ	0.5	U	0.25	LJ	0.5	U
TH11620	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11627	NS		NS		NS		0.5	U	NS		NS		NS		NS		NS		NS	
TH11635	0.5	U	0.5	U	0.5	U	0.64		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11703	0.5	U	0.5	U	0.5	U	0.64		0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
TH11722	0.5	U	0.5	U	0.5	U	0.64		0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
TH11723	0.5	U	0.5	U	1.6	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11737	NS		NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
TO10700	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
TO10700LPT	NS		NS		NS		NS		NS		0.5	U	0.5	U	0.5	U	1	U	0.5	U
TO11023	0.13	LJ	0.11	LJ	0.5	U	0.5	U	0.5	U	0.5	U	0.26	LJ	0.26	LJ	0.3	LJ	0.29	LJ
TO11024	4.9		5.6		5.8		5.2		NS		NS		NS		NS		NS		NS	
TO11033	NS		0.31	LJ	0.38	LJ	0.45	LJ	0.71		0.63		0.84		0.76		1	U	0.49	LJ
TO11205	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TO11230	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS	
TO11305	0.5	U	0.5	U	0.5	U	NS		NS		NS		NS		NS		NS		NS	
TT11014	5.2		0.5	U	9.1		8.2	J	3.7		3.9	J	11.5		13.2		11.5		11	
TT11015	5.6		5.9		8.1		0.5	U	5.7		6.1		5.6		4.6		3.6		4.6	
TT11031	1.6		2.5		2.5		2.3		1.2		1.8		1.5		1.9		1.3		NS	
TT11039	0.52		0.77		0.32	LJ	NS		NS		NS		NS		NS		NS		NS	
TT11102	0.25	LJ	0.28	LJ	0.21	LJ	0.5	U	0.5	U	0.5	U	0.053	LJ	0.5	U	0.5	U	0.5	U
TT11118	0.26	LJ	NS		NS		NS		NS		NS		NS		NS		NS		NS	
TT11123	1.2		1	U	0.93		NS		0.63		1	U	NS		NS		NS		1.2	
TT11124	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TT11203	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS		NS		NS	U
TT11215	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TT11322	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
WE10710	NS		NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
WE10711	NS		NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
WE10815	NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
Deep Monitor Wells																				
MW-11R	NS		0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
MW-14	10		0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
MW-17	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
MW-18	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
MW-19	NS		0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
Maximum and Minimum Concentrations of cis-1,2-Dichloroethylene (cis-1,2-DCE) in Groundwater Wells																				
Maximum cis-1,2-DCE Concentration (bold value indicates maximum of all samples)	10		5.9		9.1		8.2		5.7		6.1		11.5		13.2		**21**		11	
Minimum cis-1,2-DCE Concentration (bold value indicates minimum of all samples)	0.13	LJ	0.11	LJ	0.21	LJ	0.45	LJ	0.61		0.18	LJ	**0.053**	LJ	0.26	LJ	0.22	LJ	0.056	LJ

Notes:

cis-1,2-DCE concentration <= 0.5 ppb (Quantitation Limit)

cis-1,2-DCE concentration >0.5 to <= 70 ppb

cis-1,2-DCE concentration > 70 ppb (MCL)

J: Estimated value above detection limit and below quantitation limit

L: Value contains low bias

NS: Well not sampled

U: Undetected, value below detection limit

Table 2-3

Concentration of cis-1,2-Dichloroethylene (cis-1,2-DCE) in Groundwater from Private Wells and Monitor Wells

Jones Road Superfund Site
Houston, Texas

Location ID	Aug. '05		Nov. '05		Feb. '06		May/ Jul. '06		Aug. '06		Nov. '06		Feb. '07		May '07		Aug. '07		Nov. '07	
	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual

Key to Figure 1-2

Location Code	Street Name
AD	Advance Drive
BH	Bexhill
BL	Barely Lane
CP	Campos Drive
DK	Dakar Drive
DM	Dermott Drive
ES	Echo Spring Lane
FB	Foxboro Drive
FV	Forest Valley Drive
GL	Glenora Drive
JR	Jones Road
JRW	Jones Road West
MI	Mile Drive
OV	Oak Valley Drive
PH	Possum Hollow Lane
TC	Timber Crest Boulevard
TH	Timber Hollow
TO	Tower Oaks Blvd
TT	Tall Timbers Drive
WE	Woodedge Drive

Example: Location JR11535 in the table indicates 11535 Jones Road in Figure 1-2

Table 2-4

Concentration of trans-1,2-Dichloroethylene (trans-1,2-DCE) in Groundwater from Private Wells and Monitor Wells

Jones Road Superfund Site
Houston, Texas

	Aug. '05		Nov. '05		Feb. '06		May/ Jul. '06		Aug. '06		Nov. '06		Feb. '07		May '07		Aug. '07		Nov. '07	
Location ID	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual
AD11502	NS		0.5	U	NS		0.5	U	NS		NS		NS		0.5	U	NS		0.5	U
AD11511	NS		NS		NS		NS		0.5	U	NS		NS		NS		1	U	NS	
AD11603	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		NS		NS	
AD11619	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
AD11702	NS		NS		NS		0.5	U	NS		NS		NS		0.5	U	1	U	NS	
AD11714	NS		NS		NS		NS		0.5	U	NS		NS		NS		1	U	NS	
BH11603	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		NS		0.5	U
BH11614	NS		0.5	U	NS		0.5	U	0.5	U	NS		NS		0.5	U	1	U	NS	
BH11710	NS		0.5	U	NS		NS		NS		NS		NS		NS		NS		NS	
BL10819	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
CP11510	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
CP11610	NS		NS		NS		0.5	U	NS		NS		NS		0.5	U	NS		NS	
CP11710	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		NS		0.5	U
CP11711	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		1	U	NS	
CP11718	0.5	U	0.5	U	0.5	U	NS		0.5	U	NS		NS		NS		NS		NS	
DK11503	NS		NS		NS		0.5	U	NS		NS		NS		NS		NS		NS	
DK11603	NS		NS		NS		NS		NS		NS		NS		NS		NS		0.5	U
DK11611	NS		0.5	U	NS		NS		0.5	U	NS		NS		NS		1	U	NS	
DK11702	NS		NS		NS		0.5	U	NS		NS		NS		0.5	U	NS		NS	
DK11703	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		NS		NS	
DK11707	NS		NS		NS		NS		NS		NS		NS		0.5	U	NS		NS	
DK11710	NS		0.5	U	NS		NS		NS		NS		NS		NS		NS		NS	
DK11718	NS		NS		NS		NS		0.5	U	NS		NS		NS		1	U	NS	
DM11502	NS		NS		NS		NS		0.5	U	NS		NS		NS		NS		NS	
DM11506	NS		0.5	U	NS		0.5	U	NS		NS		NS		0.5	U	1	U	NS	
DM11507	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		1	U	NS	
DM11513	NS		NS		NS		NS		0.5	U	NS		NS		NS		NS		0.5	U
DM11515	NS		NS		NS		0.5	U	NS		NS		NS	U	0.5	U	1	U	NS	
ES11627	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
ES11643	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
ES11703	0.5	U	0.5	U	0.5	U	0.5	U	NS		NS		NS		NS		NS		0.5	U
FB11502	0.5	U	NS		NS		NS		NS		NS		NS		NS		0.5	U	NS	
FB11607	NS		0.5	U	NS		NS		NS		NS		NS		NS		NS		NS	
FB11610	NS		NS		0.5	U	NS		NS		NS		NS		NS		NS		NS	
FB11614	NS		0.5	U	NS		NS		0.5	U	NS		NS		NS		NS		0.5	U
FV11110	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11118	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11123	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11127	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11130	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U
FV11215	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11231	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U
FV11315	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11319	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11310	0.5	U	NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11402	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11506	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11514	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11606	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11614	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11622	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11702	0.5	U	0.5	U	0.5	U	NS		NS		NS		NS		NS		NS		NS	
JR11010	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
JR11043	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
JR11515	0.5	U	NS		NS		NS		NS		NS		NS		NS		NS		NS	
JR11528	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	0.5	U
JR11535	0.078	LJ	0.08	LJ	0.5	U	0.5	U	0.5	U	1	U	2	U	1	U	1	U	1	U
JR117291/2	0.5	U	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U	1	U	0.5	U
JRW11234	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

Table 2-4

Concentration of trans-1,2-Dichloroethylene (trans-1,2-DCE) in Groundwater from Private Wells and Monitor Wells

Jones Road Superfund Site
Houston, Texas

Location ID	Aug. '05		Nov. '05		Feb. '06		May/ Jul. '06		Aug. '06		Nov. '06		Feb. '07		May '07		Aug. '07		Nov. '07	
	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual
MI11507	NS		NS		NS		NS		NS		0.5	U	0.5	U	NS		0.5	U	NS	
MI11510	NS		NS		NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS	
MI11515	NS		NS		NS		NS		NS		NS		NS		NS		NS		0.5	U
MI11611	NS		0.5	U	NS		NS		0.5	U	NS		NS		0.5	U	NS		0.5	U
OV11618	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
PH11651	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS		NS		NS		NS	
PH11702	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
PH11710	NS		NS		0.5	U	NS		NS		NS		NS		NS		NS		NS	
PH11738	NS		NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
PH11739	NS		NS		NS		0.5	U	0.5	U	NS		NS		NS		NS		NS	
TC11106	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U
TC11108	0.5	U	NS		NS		NS		NS		NS		0.5	U	NS		NS		NS	
TC11140	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TC11206	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TC11214	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS		NS		0.5	U	0.5	U	0.5	U
TC11219	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TC11315	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TC11330	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11602	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11603	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11611	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11620	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11627	NS		NS		NS		0.5	U	NS		NS		NS		NS		NS		NS	
TH11635	0.5	U	0.5	U	0.5	U	0.64		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11703	0.5	U	0.5	U	0.5	U	0.64		0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
TH11722	0.5	U	0.5	U	0.5	U	0.64		0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
TH11723	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11737	NS		NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
TO10700	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
TO10700LPT	NS		NS		NS		NS		NS		0.5	U	0.5	U	0.5	U	1	U	0.5	U
TO11023	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5		0.5		0.5	
TO11024	0.5	U	0.5	U	0.5	U	0.5	U	NS		NS		NS		NS		NS		NS	
TO11033	NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
TO11205	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TO11230	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS	
TO11305	0.5	U	0.5	U	0.5	U	NS		NS		NS		NS		NS		NS		NS	
TT11014	0.057	LJ	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
TT11015	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
TT11031	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	NS	
TT11039	0.5	U	0.5	U	0.5	U	NS		NS		NS		NS		NS		NS		NS	
TT11102	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TT11118	0.5	U	NS		NS		NS		NS		NS		NS		NS		NS		NS	
TT11123	0.5	U	0.5	U	0.5	U	NS		0.5	U	1	U	NS		NS		NS		0.5	U
TT11124	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TT11203	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS		NS		NS	
TT11215	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TT11322	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
WE10710	NS		NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
WE10711	NS		NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
WE10815	NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
Deep Monitor Wells																				
MW-11R	NS		0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
MW-14	10	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
MW-17	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
MW-18	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
MW-19	NS		0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
Maximum and Minimum Concentrations of trans-1,2-Dichloroethylene (trans-1,2-DCE) in Groundwater Wells																				
Maximum trans-1,2-DCE Concentration (bold value indicates maximum of all samples)	**10**		0.5		0.5		0.64		0.5		1		2		1		1		1	
Minimum trans-1,2-DCE Concentration (bold value indicates minimum of all samples)	**0.057**	LJ	0.08	LJ			0.64								0.5				0.5	

Notes:

trans-1,2-DCE concentration <= 0.5 ppb (Quantitation Limit)
trans-1,2-DCE concentration >0.5 to <= 100 ppb
trans-1,2-DCE concentration >100 ppb (MCL)

J: Estimated value above detection limit and below quantitation limit
L: Value contains low bias
NS: Well not sampled
U: Undetected, value below detection limit

Table 2-4

Concentration of trans-1,2-Dichloroethylene (trans-1,2-DCE) in Groundwater from Private Wells and Monitor Wells

Jones Road Superfund Site
Houston, Texas

Location ID	Aug. '05		Nov. '05		Feb. '06		May/ Jul. '06		Aug. '06		Nov. '06		Feb. '07		May '07		Aug. '07		Nov. '07	
	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual

Key to Figure 1-2

Location Code	Street Name
AD	Advance Drive
BH	Bexhill
BL	Barely Lane
CP	Campos Drive
DK	Dakar Drive
DM	Dermott Drive
ES	Echo Spring Lane
FB	Foxboro Drive
FV	Forest Valley Drive
GL	Glenora Drive
JR	Jones Road
JRW	Jones Road West
MI	Mile Drive
OV	Oak Valley Drive
PH	Possum Hollow Lane
TC	Timber Crest Boulevard
TH	Timber Hollow
TO	Tower Oaks Blvd
TT	Tall Timbers Drive
WE	Woodedge Drive

Example: Location JR11535 in the table indicates 11535 Jones Road in Figure 1-2

Table 2-5

Concentration of Vinyl Chloride (VC) in Groundwater from Private Wells and Monitor Wells

Jones Road Superfund Site
Houston, Texas

	Aug. '05		Nov. '05		Feb. '06		May/ Jul. '06		Aug. '06		Nov. '06		Feb. '07		May '07		Aug. '07		Nov. '07	
Location ID	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual
AD11502	NS		0.5	U	NS		0.5	U	NS		NS		NS		0.5	U	NS		0.5	U
AD11511	NS		NS		NS		NS		0.5	U	NS		NS		NS		1	U	NS	
AD11603	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		NS		NS	
AD11619	0.14	LJ	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
AD11702	NS		NS		NS		0.5	U	NS		NS		NS		0.5	U	1	U	NS	
AD11714	NS		NS		NS		NS		0.5	U	NS		NS		NS		1	U	NS	
BH11603	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		NS		0.5	U
BH11614	NS		0.5	U	NS		0.5	U	0.5	U	NS		NS		0.5	U	1	U	NS	
BH11710	NS		0.5	U	NS		NS		NS		NS		NS		NS		NS		NS	
BL10819	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
CP11510	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
CP11610	NS		NS		NS		0.5	U	NS		NS		NS		0.5	U	NS		NS	
CP11710	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		NS		0.5	U
CP11711	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		1	U	NS	
CP11718	0.5	U	0.5	U	0.5	U	NS		0.5	U	NS		NS		NS		NS		NS	
DK11503	NS		NS		NS		0.5	U	NS		NS		NS		NS		NS		NS	
DK11603	NS		NS		NS		NS		NS		NS		NS		NS		NS		0.5	U
DK11611	NS		0.5	U	NS		NS		0.5	U	NS		NS		NS		1	U	NS	
DK11702	NS		NS		NS		0.5	U	NS		NS		NS		0.5	U	NS		NS	
DK11703	NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS		NS		NS	
DK11707	NS		NS		NS		NS		NS		NS		NS		0.5	U	NS		NS	
DK11710	NS		0.5	U	NS		NS		NS		NS		NS		NS		NS		NS	
DK11718	NS		NS		NS		NS		0.5	U	NS		NS		NS		1	U	NS	
DM11502	NS		NS		NS		NS		0.5	U	NS		NS		NS		NS		NS	
DM11506	NS		0.5	U	NS		0.5	U	NS		NS		NS		0.5	U	1	U	NS	
DM11507	NS		NS		0.5	U	NS		NS	U	0.5	U	0.5	U	NS		1	U	NS	
DM11513	NS		NS		NS		NS		0.5	U	NS		NS		NS		NS		0.5	U
DM11515	NS		NS		NS		0.5	U	NS		NS		NS		0.5	U	1	U	NS	
ES11627	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
ES11643	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
ES11703	0.5	U	0.5	U	0.5	U	0.5		NS		NS		NS		NS		NS		0.5	U
FB11502	0.5	U	NS		NS		NS		NS		NS		NS		NS		0.5	U	NS	
FB11607	NS		0.5	U	NS		NS		NS		NS		NS		NS		NS		NS	
FB11610	NS		NS		0.5	U	NS		NS		NS		NS		NS		NS		NS	
FB11614	NS		0.5	U	NS		NS		0.5	U	NS		NS		NS		NS		0.5	U
FV11110	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11118	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11123	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11127	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11130	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	1	U
FV11215	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11231	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U
FV11315	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
FV11319	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11310	0.5	U	NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11402	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11506	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11514	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11606	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11614	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11622	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
GL11702	0.5	U	0.5	U	0.5	U	NS		NS		NS		NS		NS		NS		NS	
JR11010	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
JR11043	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS	UR	NS	UR	0.5	U	1	U	0.5	U
JR11515	0.5	U	NS		NS		NS		NS		NS		NS		NS		NS		NS	
JR11528	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	0.5	U
JR11535	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	2		1	U	1	U	1	U
JR117291/2	0.5	U	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U	1	U	0.5	U
JRW11234	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

Table 2-5

Concentration of Vinyl Chloride (VC) in Groundwater from Private Wells and Monitor Wells

Jones Road Superfund Site
Houston, Texas

Location ID	Aug. '05		Nov. '05		Feb. '06		May/ Jul. '06		Aug. '06		Nov. '06		Feb. '07		May '07		Aug. '07		Nov. '07	
	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual
MI11507	NS		NS		NS		NS		NS		0.5	U	0.5	U	NS		0.5	U	NS	
MI11510	NS		NS		NS		NS		0.5	U	NS		NS		0.5	U	0.5	U	NS	
MI11515	NS		NS		NS		NS		NS		NS		NS		NS		NS		0.5	U
MI11611	NS		0.5	U	NS		NS		0.5	U	NS		NS		0.5	U	NS		0.5	U
OV11618	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
PH11651	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS		NS		NS		NS	
PH11702	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
PH11710	NS		NS		0.5	U	NS		NS		NS		NS		NS		NS		NS	
PH11738	NS		NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
PH11739	NS		NS		NS		0.5	U	0.5	U	NS		NS		NS		NS		NS	
TC11106	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS		0.5	U	0.5	U	0.5	U
TC11108	0.5	U	NS		NS		NS		NS		NS		0.5	U	NS		NS		NS	
TC11140	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TC11206	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TC11214	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS		NS		0.5	U	0.5	U	0.5	U
TC11219	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TC11315	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TC11330	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11602	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11603	0.11	LJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11611	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11620	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11627	NS		NS		NS		0.5	U	NS		NS		NS		NS		NS		NS	
TH11635	0.5	U	0.5	U	0.5	U	0.64		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11703	0.5	U	0.5	U	0.5	U	0.64		0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
TH11722	0.5	U	0.5	U	0.5	U	0.64		0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
TH11723	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TH11737	NS		NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
TO10700	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
TO10700LPT	NS		NS		NS		NS		NS		0.5	U	0.5	U	0.5	U	1	U	0.5	U
TO11023	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TO11024	0.5	U	0.5	U	0.5	U	0.5	U	NS		NS		NS		NS		NS		NS	
TO11033	NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
TO11205	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TO11230	NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS	
TO11305	0.5	U	0.5	U	0.5	U	NS		NS		NS		NS		NS		NS		NS	
TT11014	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
TT11015	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.5	U
TT11031	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U	NS	
TT11039	0.5	U	0.5	U	0.5	U	NS		NS		NS		NS		NS		NS		NS	
TT11102	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TT11118	0.5	U	NS		NS		NS		NS		NS		NS		NS		NS		NS	
TT11123	0.5	U	0.5	U	0.5	U	NS		0.5	U	1	U	NS		NS		NS		0.5	U
TT11124	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TT11203	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	NS		NS		NS	
TT11215	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
TT11322	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
WE10710	NS		NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
WE10711	NS		NS		NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
WE10815	NS		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U	0.5	U
Deep Monitor Wells																				
MW-11R	NS		0.5	U	0.31	LJ	0.86		0.5	U	2.3		1	U	1	U	1	U	4.5	
MW-14	10	U	1.2		0.5	U	0.32	LJ	1	U	1	U	1.8		1	U	1.1		1.4	
MW-17	0.5	U	0.5	U	0.64		0.5	U	0.5	U	1	U	1	U	1	U	1	U	0.15	LJ
MW-18	0.5	U	0.5	U	0.54		1.4		2.1		2.3		1.8	L	3.1		2		4.1	
MW-19	NS		0.5	U	0.5	U	0.49	LJ	0.5	U	1.1		1	U	1.2		1.2		1.8	
Maximum and Minimum Concentrations of Vinyl chloride (VC) in Groundwater Wells																				
Maximum VC Concentration (bold value indicates maximum of all samples)	**10**		1.2		0.64		1.4		2.1		2.3		2		3.1		2		4.5	
Minimum VC Concentration (bold value indicates minimum of all samples)	**0.11**	LJ	1.2		0.31	LJ	0.32	LJ	2.1		2.3		1.8		1.2		1.1		0.15	LJ

Notes:

VC concentration <= 0.5 ppb (Quantitation Limit)

VC concentration >0.5 to <= 2.0 ppb

VC concentration > 2.0 ppb (MCL)

J: Estimated value above detection limit and below quantitation limit

L: Value contains low bias

NS: Well not sampled

R: Value rejected and not included in data evaluation

U: Undetected, value below detection limit

Table 2-5

Concentration of Vinyl Chloride (VC) in Groundwater from Private Wells and Monitor Wells

Jones Road Superfund Site
Houston, Texas

Location ID	Aug. '05		Nov. '05		Feb. '06		May/ Jul. '06		Aug. '06		Nov. '06		Feb. '07		May '07		Aug. '07		Nov. '07	
	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual	ug/L	Qual

Key to Figure 1-2

Location Code	Street Name
AD	Advance Drive
BH	Bexhill
BL	Barely Lane
CP	Campos Drive
DK	Dakar Drive
DM	Dermott Drive
ES	Echo Spring Lane
FB	Foxboro Drive
FV	Forest Valley Drive
GL	Glenora Drive
JR	Jones Road
JRW	Jones Road West
MI	Mile Drive
OV	Oak Valley Drive
PH	Possum Hollow Lane
TC	Timber Crest Boulevard
TH	Timber Hollow
TO	Tower Oaks Blvd
TT	Tall Timbers Drive
WE	Woodedge Drive

Example: Location JR11535 in the table indicates 11535 Jones Road in Figure 1-2

Appendix A

Risk Assessment Tables

TABLE 1A
SELECTION OF EXPOSURE PATHWAYS
JONES ROAD SUPERFUND SITE

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Ground Water	Ground Water	Tap Water	Resident	Adult	Ingestion	Quantitative for Anticipated Private Sources	Exposures to groundwater from private wells at residences not anticipated to receive municipal water are considered complete. Some residences will be supplied with municipal water, and any affected city well would be out of service until remediated.
						Inhalation	Quantitative	Exposure to indoor vapors assumed complete.
						Dermal	None	Intake of volatile compounds through dermal exposure during showering is assumed to be less than by ingestion and inhalation pathways based on reduced frequency and duration of exposure and by reduced contact with skin surface through volatilization.
					Child	Ingestion	Quantitative	Exposures to groundwater from private wells at residences not anticipated to receive municipal water are considered complete. Some residences will be supplied with municipal water, and any affected city well would be out of service until remediated.
						Inhalation	Quantitative	Exposure to indoor vapors assumed complete.
						Dermal	None	Intake of volatile compounds through dermal exposure during showering is assumed to be less than by ingestion and inhalation pathways based on reduced frequency and duration of exposure and by reduced contact with skin surface through volatilization.
				Indoor Worker	Adult	Ingestion	Quantitative	Municipal water is supplied to area businesses, and any affected city well would be out of service until remediated.
						Inhalation	Quantitative	Some residences will be supplied with municipal water, and any affected city well would be out of service until remediated. Exposures to groundwater from private wells at residences not anticipated to receive municipal water are considered complete.
						Dermal	None	The indoor worker is not expected to engage in activity that would result in substantial dermal contact (showering, etc.).

TABLE 1B
SELECTION OF EXPOSURE PATHWAYS
JONES ROAD SUPERFUND SITE

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Ground Water	Air (via vapor intrusion)	Indoor Air	Resident [a]	Adult	Inhalation	Quantitative	Indoor air concentrations were detected and measured.
					Child	Inhalation	Quantitative	Indoor air concentrations were detected and measured.
				Indoor Worker	Adult	Inhalation	Quantitative	Indoor air concentrations were detected and measured.

TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

JONES ROAD SUPERFUND SITE

Scenario Timeframe: Current-Future
Medium: Ground Water
Exposure Medium: Ground Water

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (N/C) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (5)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Tap Water	127-18-4	Tetrachloroethylene	0.056 LJ	110 =	ug/L	TT11014	24%	0.5 - 10	110	NA	0.43 C	5	MCL	Y	ASTV
	79-01-6	Trichloroethylene	0.04 LJ	5.7, 10 U	ug/L	LR11515, MW-14	14%	0.5 - 10	5.7, 10 U	NA	0.028 C	5	MCL	Y	ASTV
	107-06-2	cis-1,2-Dichloroethylene	0.053 LJ	21 =	ug/L	JR11535	18%	0.5 - 10	21 =	NA	61 N	70	MCL	N	BSTV
	156-60-5	trans-1,2-Dichloroethylene	0.057 LJ	10 U	ug/L	MW-14	11%	0.5 - 10	10 U	NA	100 N	100	MCL	N	BSTV
	75-01-4	Vinyl Chloride	0.11 LJ	4.5, 10 U	ug/L	MW-11R	12%	0.5 - 10	4.5, 10 U	NA	0.015 C	2	MCL	Y	ASTV

Footnote Instructions:

(1) (=) = Analytical result is valid with no QC qualifiers.

(2) Highest detected value for the data set

(3) Specify source(s) for the "Background Value".

(4) The lower of MCL values or EPA Region 6 Medium-Specific Screening Levels (2007); risk = 1E-06, hazard = 1; N/C = non-carcinogenic or carcinogenic.

(5) (ASTV) = Above screening toxicity value, (BSTV) = Below screening toxicity value

TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

JONES ROAD SUPERFUND SITE

Scenario Timeframe: Current/Future
Medium: Ground Water
Exposure Medium: Air (via Vapor Intrusion)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (N/C) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (5)	COPC Flag (Y/N)	Rationale for Selection or Deletion (6)
West Sump, Center Room	127-18-4	Tetrachloroethylene	9.5	14.0	ug/m^3	Center Room	2/2	1.4 - 1.4	14.0	N/A	8.1 C		USEPA, 2002a	Y	ASTV
	79-01-6	Trichloroethylene	1.7	1.8	ug/m^3	Center Room	2/2	1.1 - 1.1	1.8	N/A	0.022 C		USEPA, 2002a	Y	ASTV
	156-59-2	cis-1,2-Dichloroethene	1.7	1.8	ug/m^3	Center Room	2/2	0.79-0.79	1.8	N/A	35 N		USEPA, 2002a	N	BSTV
	156-60-5	trans-1,2-Dichloroethene	0.79 U	0.79 U	ug/m^3	Center Room	0/2	0.79-0.79	0.8	N/A	70 N		USEPA, 2002a	N	BSTV
	75-01-4	Vinyl Chloride	0.51 U	0.51 U	ug/m^3	Center Room	0/2	0.51-0.51	0.51	N/A	2.8 C		USEPA, 2002a	N	ASTV

Footnote Instructions:

(1) Minimum value sample from West Sump location. Trans-1,2-dichloroehylene and vinyl chloride were not detected, values equal reporting limit.

(2) Highest detected value for the data set

(3) Specify source(s) for the "Background Value".

(4) Site-specific; equal to 1E-06 risk or hazard of 1 from indoor air; N/C - non-carcinogenic or carcinogenic

(5) Risk-based screening values described in the Vapor Intrusion Study report (Shaw, 2008c) that were taken from USEPA (2002a) guidance.

(6) (ASTV) = Above screening toxicity value

(BSTV) = Below screening toxicity value

TABLE 3.1
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
JONES ROAD SUPERFUND SITE

Scenario Timeframe: Current/Future
Medium: Ground Water
Exposure Medium: Ground Water

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	UCL (Distribution)	Maximum Concentration (Qualifier) (1)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale (2)
Tap Water	Tetrachloroethylene	ug/L	3.24E+00	Nonparametric	110 =	3.71E+00	ug/L	Bootstrap	See Appendix B
	Trichloroethylene	ug/L	6.21E-01	Nonparametric	5.7, 10 U	6.63E-01	ug/L	Bootstrap	See Appendix B
	Vinyl Chloride	ug/L	5.88E-01	Nonparametric	4.5, 10 U	6.14E-01	ug/L	Bootstrap	See Appendix B

Footnotes:

(1) (=) = Analytical result is valid with no QC qualifiers.
(2) See Appendix B

TABLE 3.2
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
JONES ROAD SUPERFUND SITE

Scenario Timeframe: Current/Future
Medium: Ground Water
Exposure Medium: Air (via Vapor Intrusion)

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	UCL (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Center Room	Tetrachloroethylene	ug/m^3	-	-	14.0	14.0	ug/m^3	max	1 sample point
	Trichloroethylene	ug/m^3	-	-	1.8	1.8	ug/m^3	max	1 sample point
	Vinyl Chloride	ug/m^3	-	-	0.51	0.51	ug/m^3	max	1 sample point

TABLE 4.1

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

JONES ROAD SUPERFUND SITE

Scenario Timeframe: Future
Medium: Ground Water
Exposure Medium: Ground Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name (1)
Ingestion	Resident	Adult	Tap Water	IRw	Ingestion Rate of Water	2	L/day	US EPA, 1997	
				IRWadj	Age-adjusted Ingestion Rate	1.1	L-year/kg-day	USEPA, 1991b	
				MF	Modifying Factor	0.001	mg/ug	US EPA, 1989	
				EF	Exposure Frequency	350	days/year	USEPA, 1991b	
				ED	Exposure Duration	30	years	USEPA, 1989	Intake from Birth (carcinogen) =
				BW	Body Weight	70	kg	USEPA, 1989	EPC x IRwadj x MF x EF
				ATc	Averaging Time - carcinogen	25550	days	USEPA, 1989	Atc
				ATnc	Averaging Time - non-carcinogen	10950	days	USEPA, 1989	
		Child	Tap Water	IRw	Ingestion Rate of Water	1	L/day	US EPA, 1997	
				MF	Modifying Factor	0.001	mg/ug	US EPA, 1989	Intake (noncarcinogen) (adult or child) =
				EF	Exposure Frequency	350	days/year	USEPA, 1991b	
				ED	Exposure Duration	6	years	USEPA, 1989	IRw x MF x EF x ED
				BW	Body Weight	15	kg	USEPA, 1989	BW x Atnc
				ATc	Averaging Time - carcinogen	25550	days	USEPA, 1989	
				ATnc	Averaging Time - non-carcinogen	2190	days	USEPA, 1989	

Footnote Instructions:

(1) Refer to Section 3.6 of the HHRA for information regarding modeled intake development.

TABLE 4.2.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
JONES ROAD SUPERFUND SITE

Scenario Timeframe: Current/Future
Medium: Ground Water
Exposure Medium: Air (via vapor intrusion)

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name (a)
Inhalation	Resident	Resident	Indoor Air	InhR	Inhalation Rate	20	m3/day	USEPA, 1991b	Intake from Birth (carcinogen) = EPC x InhRadj x MF x EF / Atc
				InhRadj	Age-adjusted Inhalation Rate	11	m3-yr/kg-d	USEPA, 2004a	
				MF	Modifying Factor	0.001	mg/ug	USEPA, 1989	
				EF	Exposure Frequency	350	days/year	USEPA, 1991b	
				ED	Exposure Duration	30	years	USEPA, 1989	
				BW	Body Weight	70	kg	USEPA, 1989	
				ATc	Averaging Time - carcinogen	25550	days	USEPA, 1989	
				ATnc	Averaging Time - non-carcinogen	10950	days	USEPA, 1989	
		Child	Indoor Air	InhR	Inhalation Rate	10	m3/day	USEPA, 2002	Intake (noncarcinogen) (adult or child) = InhR x MF x EF x ED / BW x ATc (or ATnc)
				MF	Modifying Factor	0.001	mg/ug	USEPA, 1989	
				EF	Exposure Frequency	350	days/year	USEPA, 1991b	
				ED	Exposure Duration	6	years	USEPA, 1991b	
				BW	Body Weight	15	kg	USEPA, 1991b	
				ATc	Averaging Time - carcinogen	25550	days	USEPA, 1989	
				ATnc	Averaging Time - non-carcinogen	2190	days	USEPA, 1989	
	Worker	Adult	Indoor Air	InhR	Inhalation Rate	13	m3/day	USEPA, 1997	Adult Intake (carcinogen or noncarcinogen) = InhR x MF x EF x ED / BW x ATc (or ATnc)
				MF	Modifying Factor	0.001	mg/ug	USEPA, 1989	
				EF	Exposure Frequency	250	days/year	USEPA, 1991b	
				ED	Exposure Duration	25	years	USEPA, 1991b	
				BW	Body Weight	70	kg	USEPA, 1989	
				ATc	Averaging Time - carcinogen	25550	days	USEPA, 1989	
				ATnc	Averaging Time - non-carcinogen	9125	days	USEPA, 1989	

Footnote Instructions:

(a) Modeled intake can be found on RAGS D Table 7.1

TABLE 5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL

JONES ROAD SUPERFUND SITE

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal	Absorbed RfD for Dermal		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s) *	Date(s) (MM/DD/YYYY)
Tetrachloroethylene	Chronic	1.0E-02	(mg/kg-d)	NA	NA	NA			R6 MSSLs/IRIS	Nov-07
Trichloroethylene	Chronic	3.0E-04	(mg/kg-d)	NA	NA	NA			R6 MSSLs/NCEA	Nov-07
Vinyl Chloride	Chronic	3.0E-03	(mg/kg-d)	NA	NA	NA			R6 MSSLs/IRIS	Nov-07

TABLE 5.2

NON-CANCER TOXICITY DATA -- INHALATION

JONES ROAD SUPERFUND SITE

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfDi		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s) *	Date(s) (MM/DD/YYYY)
Tetrachloroethylene	chronic	6.0E-01	mg/m^3	1.1E-01	mg/kg-day			R6 MSSLs/IRIS	Nov-07
Trichloroethylene	chronic	4.0E-02	mg/m^3	1.1E-02	mg/kg-day			R6 MSSLs/NCEA	Nov-07

* The Region 6 Medium-Specific Screening Levels (R6 MSSLs) refer to toxicity data from IRIS or NCEA.

TABLE 6.1
CANCER TOXICITY DATA -- ORAL/DERMAL
JONES ROAD SUPERFUND SITE

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal	Absorbed Cancer Slope Factor for Dermal		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s) (1)	Date(s) (MM/DD/YYYY)
Tetrachloroethylene	5.4E-01	$(mg/kg\text{-}day)^{-1}$	NA	NA	NA		R6 MSSLs/other	Nov-07
Trichloroethylene	4.0E-01	$(mg/kg\text{-}day)^{-1}$	NA	NA	NA		R6 MSSLs/NCEA	Nov-07
Vinyl Chloride (adult exposure)	7.2E-01	$(mg/kg\text{-}day)^{-1}$	NA	NA	NA	A	R6 MSSLs/IRIS	Nov-07
Vinyl Chloride (exposure from birth)	1.5E+00	$(mg/kg\text{-}day)^{-1}$	NA	NA	NA	A	R6 MSSLs/IRIS	Nov-07

TABLE 6.2
CANCER TOXICITY DATA -- INHALATION
JONES ROAD SUPERFUND SITE

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s) (1)	Date(s) (MM/DD/YYYY)
Tetrachloroethylene	5.9E-06	$(ug/m^3)^{-1}$	2.1E-02	$(mg/kg\text{-}day)^{-1}$		R6 MSSLs/other	Nov-07
Trichloroethylene	2.0E-06	$(ug/m^3)^{-1}$	7.0E-03	$(mg/kg\text{-}day)^{-1}$		Cal-EPA	Dec-04

Footnote Instructions:

TABLE 7.1.1

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

JONES ROAD SUPERFUND SITE

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Ground Water	Ground Water	Tap Water	Ingestion	Tetrachloroethylene	3.7E+00	ug/L	5.6E-05	(mg/kg-day)	5.4E-01	(mg/kg-day)-1	3.0E-05	1.0E-04	(mg/kg-day)	1.0E-02	(mg/kg-d)	1.0E-02
				Trichloroethylene	6.63E-01	ug/L	1.0E-05	(mg/kg-day)	4.0E-01	(mg/kg-day)-1	4.0E-06	1.8E-05	(mg/kg-day)	3.0E-04	(mg/kg-d)	6.1E-02
				Vinyl Chloride (adult exposure)	6.14E-01	ug/L	7.2E-06	(mg/kg-day)	7.2E-01	(mg/kg-day)-1	5.2E-06					
				Vinyl Chloride (exposure from birth)	6.14E-01	ug/L	9.3E-06	(mg/kg-day)	1.5E+00	(mg/kg-day)-1	1.4E-05	1.7E-05	(mg/kg-day)	3.0E-03	0.0E+00	5.6E-03
			Exp. Route Total							Adult Expsoure	3.9E-05				Adult Exposure Hazard Index (HI)	7.1E-02
										Exposure from Birth	4.8E-05					

TABLE 7.1.2
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
JONES ROAD SUPERFUND SITE

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Ground Water	Ground Water	Tap Water	Ingestion	Tetrachloroethylene	3.7146E+00	ug/L	see Table 7.1.1	(mg/kg-day)	see Table 7.1.1	(mg/kg-day)-1	see Table 7.1.1	2.4E-04	(mg/kg-day)	1.0E-02	(mg/kg-d)	2.4E-02
				Trichloroethylene	6.63E-01	ug/L	see Table 7.1.1	(mg/kg-day)	see Table 7.1.1	(mg/kg-day)-1	see Table 7.1.1	4.2E-05	(mg/kg-day)	3.0E-04	(mg/kg-d)	1.4E-01
				Vinyl Chloride	6.14E-01	ug/L	see Table 7.1.1	(mg/kg-day)	see Table 7.1.1	(mg/kg-day)-1	see Table 7.1.1	3.9E-05	(mg/kg-day)	3.0E-03	(mg/kg-d)	1.3E-02
			Exp. Route Total												Child Hazard Index (HI)	1.8E-01
	Exposure Medium Total															1.8E-01

TABLE 7.2.1
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
JONES ROAD SUPERFUND SITE

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Air	Air	Indoor Air	Inhalation	Tetrachloroethylene	1.4E+01	ug/m^3	2.1E-03	mg/kg-d	2.1E-02	(mg/kg-d)$^{-1}$	4.4E-05	3.8E-03	mg/kg-d	1.1E-01	mg/kg-d	3.5E-02
		Center Room		Trichloroethylene	1.8E+00	ug/m^3	2.7E-04	mg/kg-d	7.0E-03	(mg/kg-d)$^{-1}$	1.9E-06	4.9E-04	mg/kg-d	1.1E-02	mg/kg-d	4.5E-02
			Exp. Route Total								4.5E-05	Adult Hazrd Index (HI)				8.0E-02
	Exposure Medium Total										4.5E-05					8.0E-02

TABLE 7.2.2

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

JONES ROAD SUPERFUND SITE

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Air	Air	Indoor Air	Inhalation	Tetrachloroethylene	1.4E+01	ug/m^3	see Table 7.2.1	mg/kg-d	see Table 7.2.1	(mg/kg-d)$^{-1}$	see Table 7.2.1	8.9E-03	mg/kg-d	1.1E-01	mg/kg-d	8.1E-02
		Center Room		Trichloroethylene	1.8E+00	ug/m^3	see Table 7.2.1	mg/kg-d	see Table 7.2.1	(mg/kg-d)$^{-1}$	see Table 7.2.1	1.2E-03	mg/kg-d	1.1E-02	mg/kg-d	1.3E-05
			Exp. Route Total								see Table 7.2.1				Child Hazard Index (HI)	8.1E-02

TABLE 7.2.3
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
JONES ROAD SUPERFUND SITE

Scenario Timeframe: Current/Future
Receptor Population: Indoor Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Air	Air	Indoor Air Center Room	Inhalation	Tetrachloroethylene	1.4E+01	ug/m^3	6.4E-04	mg/kg-d	2.1E-02	$(mg/kg\text{-}d)^{-1}$	1.3E-05	1.8E-03	mg/kg-d	1.1E-01	mg/kg-d	1.6E-02
				Trichloroethylene	1.8E+00	ug/m^3	8.2E-05	mg/kg-d	7.0E-03	$(mg/kg\text{-}d)^{-1}$	5.7E-07	2.3E-04	mg/kg-d	1.1E-02	mg/kg-d	2.1E-02
			Exp. Route Total								1.4E-05				Hazard Index (HI)	3.7E-02

Appendix B

TCEQ Tier I Exclusion Criteria Checklist for the Ecological Evaluation

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Figure : 30 TAC §350.77(b)

TIER 1: Exclusion Criteria Checklist

This exclusion criteria checklist is intended to aid the person and the TNRCC in determining whether or not further ecological evaluation is necessary at an affected property where a response action is being pursued under the Texas Risk Reduction Program (TRRP). Exclusion criteria refer to those conditions at an affected property which preclude the need for a formal ecological risk assessment (ERA) because there are **incomplete or insignificant ecological exposure pathways** due to the nature of the affected property setting and/or the condition of the affected property media. This checklist (and/or a Tier 2 or 3 ERA or the equivalent) must be completed by the person for all affected property subject to the TRRP. The person should be familiar with the affected property but need not be a professional scientist in order to respond, although some questions will likely require contacting a wildlife management agency (i.e., Texas Parks and Wildlife Department or U.S. Fish and Wildlife Service). The checklist is designed for general applicability to all affected property; however, there may be unusual circumstances which require professional judgement in order to determine the need for further ecological evaluation (e.g., cave-dwelling receptors). In these cases, the person is strongly encouraged to contact TNRCC before proceeding.

Besides some preliminary information, the checklist consists of three major parts, **each of which must be completed unless otherwise instructed.** PART I requests affected property identification and background information. PART II contains the actual exclusion criteria and supportive information. PART III is a qualitative summary statement and a certification of the information provided by the person. **Answers should reflect existing conditions and should not consider future remedial actions at the affected property.** Completion of the checklist should lead to a logical conclusion as to whether further evaluation is warranted. Definitions of terms used in the checklist have been provided and users are strongly encouraged to familiarize themselves with these definitions before beginning the checklist.

Name of Facility: Jones Road

Affected Property Location: Houston, Texas

Mailing Address: NA

TNRCC Case Tracking #s: NA

Solid Waste Registration #s: NA

Voluntary Cleanup Program #: NA

EPA I.D. #s: NA

COPY

Figure: 30 TAC §350.77(b) continued

Definitions[1]

Affected property - The entire area (i.e., on-site and off-site; including all environmental media) which contains releases of chemicals of concern at concentrations equal to or greater than the assessment level applicable for the land use (i.e., residential or commercial/industrial) and groundwater classification.

Assessment level - A critical protective concentration level for a chemical of concern used for affected property assessments where the human health protective concentration level is established under a Tier 1 evaluation as described in §350.75(b) of this title (relating to Tiered Human Health PCL Evaluation), except for the protective concentration level for the soil-to-groundwater exposure pathway which may be established under Tier 1, 2, or 3 as described in §350.75(i)(7) of this title, and ecological protective concentration levels are developed, when necessary, under Tier 2 and/or 3 in accordance with §350.77(c) and/or (d), respectively of this title (relating to Ecological Risk Assessment and Development of Ecological PCLs).

Bedrock - The solid rock (i.e., consolidated, coherent, and relatively hard naturally formed material that cannot normally be excavated by manual methods alone) that underlies gravel, soil or other surficial material

Chemicals of concern - Any chemical that has the potential to adversely affect ecological or human receptors due to its concentration, distribution, and mode of toxicity. Depending on the program area, chemicals of concern may include the following: solid waste, industrial solid waste, municipal solid waste, and hazardous waste as defined in Texas Health and Safety Code, §361.003, as amended; hazardous constituents as listed in 40 Code of Federal Regulations Part 261, Appendix VIII, as amended; constituents on the groundwater monitoring list in 40 Code of Federal Regulations Part 264, Appendix IX, as amended; constituents as listed in 40 CFR Part 258 Appendices I and II, as amended; pollutant as defined in Texas Water Code, §26.001, as amended; hazardous substance as defined in Texas Health and Safety Code, §361.003, as amended, and the Texas Water Code §26.263, as amended; regulated substance as defined in Texas Water Code §26.342, as amended and §334.2 of this title (relating to Definitions), as amended; petroleum product as defined in Texas Water Code §26.342, as amended and §334.122(b)(12) of this title (relating to Definitions for ASTs), as amended; other substances as defined in Texas Water Code §26.039(a), as amended; and daughter products of the aforementioned constituents.

Community - An assemblage of plant and animal populations occupying the same habitat in which the various species interact via spatial and trophic relationships (e.g., a desert community or a pond community).

Complete exposure pathway - An exposure pathway where a human or ecological receptor is exposed to a chemical of concern via an exposure route (e.g., incidental soil ingestion, inhalation of volatiles and particulates, consumption of prey, etc).

De minimus - The description of an area of affected property comprised of one acre or less where the ecological risk is considered to be insignificant because of the small extent of contamination, the absence of protected species, the availability of similar unimpacted habitat nearby, and the lack of adjacent sensitive environmental areas.

Ecological protective concentration level - The concentration of a chemical of concern at the point of exposure within an exposure medium (e.g., soil, sediment, , groundwater, or surface water) which is determined in accordance with §350.77(c) or (d) of this title (relating to Ecological Risk Assessment and Development of Ecological Protective Concentration Levels) to be protective for ecological receptors. These concentration levels are primarily intended to be protective for more mobile or wide-ranging ecological receptors and, where appropriate, benthic invertebrate communities within the waters in the state. These concentration levels are not intended to be directly protective of receptors with limited mobility or range (e.g., plants, soil invertebrates, and

[1]These definitions were taken from 30 TAC §350.4 and may have both ecological and human health applications. For the purposes of this checklist, it is understood that only the ecological applications are of concern.

small rodents), particularly those residing within active areas of a facility, unless these receptors are threatened/endangered species or unless impacts to these receptors result in disruption of the ecosystem or other unacceptable consequences for the more mobile or wide-ranging receptors (e.g., impacts to an off-site grassland habitat eliminate rodents which causes a desirable owl population to leave the area).

Ecological risk assessment - The process that evaluates the likelihood that adverse ecological effects may occur or are occurring as a result of exposure to one or more stressors; however, as used in this context, only chemical stressors (i.e., COCs) are evaluated.

Environmental medium - A material found in the natural environment such as soil (including non-waste fill materials), groundwater, air, surface water, and sediments, or a mixture of such materials with liquids, sludges, gases, or solids, including hazardous waste which is inseparable by simple mechanical removal processes, and is made up primarily of natural environmental material.

Exclusion criteria - Those conditions at an affected property which preclude the need to establish a protective concentration level for an ecological exposure pathway because the exposure pathway between the chemical of concern and the ecological receptors is not complete or is insignificant.

Exposure medium - The environmental medium or biologic tissue in which or by which exposure to chemicals of concern by ecological or human receptors occurs.

Facility - The installation associated with the affected property where the release of chemicals of concern occurred.

Functioning cap - A low permeability layer or other approved cover meeting its design specifications to minimize water infiltration and chemical of concern migration, and prevent ecological or human receptor exposure to chemicals of concern, and whose design requirements are routinely maintained.

Landscaped area - An area of ornamental, or introduced, or commercially installed, or manicured vegetation which is routinely maintained.

Off-site property (off-site) - All environmental media which is outside of the legal boundaries of the on-site property.

On-site property (on-site) - All environmental media within the legal boundaries of a property owned or leased by a person who has filed a self-implementation notice or a response action plan for that property or who has become subject to such action through one of the agency's program areas for that property.

Physical barrier - Any structure or system, natural or manmade, that prevents exposure or prevents migration of chemicals of concern to the points of exposure.

Point of exposure - The location within an environmental medium where a receptor will be assumed to have a reasonable potential to come into contact with chemicals of concern. The point of exposure may be a discrete point, plane, or an area within or beyond some location.

Protective concentration level - The concentration of a chemical of concern which can remain within the source medium and not result in levels which exceed the applicable human health risk-based exposure limit considering cumulative risk and hazard index for both carcinogenic and non-carcinogenic effects respectively, or ecological protective concentration level at the point of exposure for that exposure pathway.

Release - Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment, with the exception of:

(A) A release that results in an exposure to a person solely within a workplace; concerning a claim that the person may assert against the person's employer;

(B) An emission from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel, or pipeline pumping station engine;

(C) A release of source, by-product, or special nuclear material from a nuclear incident, as those terms are defined by the Atomic Energy Act of 1954, as amended (42 U.S.C. §2011 et seq.), if the release is subject to requirements concerning financial protection established by the Nuclear Regulatory Commission under §170 of that Act;

(D) For the purposes of the environmental response law §104, as amended, or other response action, a release of source, by-product, or special nuclear material from a processing site designated under §102(a)(1) or §302(a) of the Uranium Mill Tailings Radiation Control Act of 1978 (42 U.S.C. §7912 and §7942), as amended; and

(E) The normal application of fertilizer.

Sediment - Non-suspended particulate material lying below surface waters such as bays, the ocean, rivers, streams, lakes, ponds, or other similar surface water body (including intermittent streams). Dredged sediments which have been removed from surface water bodies and placed on land shall be considered soils.

Sensitive environmental areas - Areas that provide unique and often protected habitat for wildlife species. These areas are typically used during critical life stages such as breeding, hatching, rearing of young, and overwintering. Examples include critical habitat for threatened and endangered species, wilderness areas, parks, and wildlife refuges.

Source medium - An environmental medium containing chemicals of concern which must be removed, decontaminated and/or controlled in order to protect human health and the environment. The source medium may be the exposure medium for some exposure pathways.

Stressor - Any physical, chemical, or biological entity that can induce an adverse response; however, as used in this context, only chemical entities apply.

Subsurface soil - For human health exposure pathways, the portion of the soil zone between the base of surface soil and the top of the groundwater-bearing unit(s). For ecological exposure pathways, the portion of the soil zone between 0.5 feet and 5 feet in depth.

Surface cover - A layer of artificially placed utility material (e.g., shell, gravel).

Surface soil - For human health exposure pathways, the soil zone extending from ground surface to 15 feet in depth for residential land use and from ground surface to 5 feet in depth for commercial/industrial land use; or to the top of the uppermost groundwater-bearing unit or bedrock, whichever is less in depth. For ecological exposure pathways, the soil zone extending from ground surface to 0.5 feet in depth.

Surface water - Any water meeting the definition of surface water in the state as defined in §307.3 of this title (relating to Abbreviations and Definitions), as amended.

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PART I. Affected Property Identification and Background Information

1) Provide a description of the specific area of the response action and the nature of the release. Include estimated acreage of the affected property and the facility property, and a description of the type of facility and/or operation associated with the affected property. Also describe the location of the affected property with respect to the facility property boundaries and public roadways.

A ground water plume of PCE exists underneath the Jones Rd. Area of Houston.

Attach available USGS topographic maps and/or aerial or other affected property photographs to this form to depict the affected property and surrounding area. Indicate attachments:

X Topo map ☐ Aerial photo ☐ Other ______________

2) Identify environmental media known or suspected to contain chemicals of concern (COCs) at the present time. Check all that apply:

Known/Suspected COC Location	Based on sampling data?	
☐ Soil ≤ 5 ft below ground surface	☐ Yes	☐ No
☐ Soil >5 ft below ground surface	☐ Yes	☐ No
x Groundwater	x Yes	☐ No
☐ Surface Water/Sediments	☐ Yes	☐ No

Explain (previously submitted information may be referenced): During the ground water investigation soil core samples were created during the drilling of monitoring wells and piezometers. None of the soil samples, between ground level and 5 feet below ground level showed any contamination of the site cocs.

Figure: 30 TAC §350.77(b) continued

3) Provide the information below for the nearest surface water body which has become or has the potential to become impacted from migrating COCs via surface water runoff, air deposition, groundwater seepage, etc. Exclude wastewater treatment facilities and stormwater conveyances/impoundments authorized by permit. Also exclude conveyances, decorative ponds, and those portions of process facilities which are:

a. Not in contact with surface waters in the State or other surface waters which are ultimately in contact with surface waters in the State; and

b. Not consistently or routinely utilized as valuable habitat for natural communities including birds, mammals, reptiles, etc.

The nearest surface water body is ______________ feet/miles from the affected property and is named ____. The water body is best described as a:

- ☐ freshwater stream: ______ perennial (has water all year)
  - ______ intermittent (dries up completely for at least 1 week a year)
  - ______ intermittent with perennial pools
- ☐ freshwater swamp/marsh/wetland
- ☐ saltwater or brackish marsh/swamp/wetland
- ☐ reservoir, lake, or pond; approximate surface acres: ________________
- ☐ drainage ditch
- ☐ tidal stream ☐ bay ☐ estuary
- ☐ other; specify ____

Is the water body listed as a State classified segment in Appendix C of the current Texas Surface Water Quality Standards; §§307.1 - 307.10?

☐ Yes Segment # __________ Use Classification:

☐ No

If the water body is not a State classified segment, identify the first downstream classified segment.

Name:

Segment #:

Use Classification;

As necessary, provide further description of surface waters in the vicinity of the affected property: The groundwater plume that exists at the site is in excess of 25 feet below ground level. There is no complete pathway between the groundwater and any surface water.

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PART II. Exclusion Criteria and Supportive Information

Subpart A. Surface Water/Sediment Exposure

1) Regarding the affected property where a response action is being pursued under the TRRP, have COCs migrated and resulted in a release or imminent threat of release to either surface waters or to their associated sediments via surface water runoff, air deposition, groundwater seepage, etc.? Exclude wastewater treatment facilities and stormwater conveyances/impoundments authorized by permit. Also exclude conveyances, decorative ponds, and those portions of process facilities which are:

   a. Not in contact with surface waters in the State or other surface waters which are ultimately in contact with surface waters in the State; <u>and</u>

   b. Not consistently or routinely utilized as valuable habitat for natural communities including birds, mammals, reptiles, etc.

☐ Yes X No

Explain: The area is a residential (suburban) community. The groundwater below the area is contaminated with PCE. The aquifer that contains the contamination is not in communication with any surface water features. The area is only used by urban tolerant wildlife.

If the answer is Yes to Subpart A above, the affected property does not meet the exclusion criteria. However, complete the remainder of Part II to determine if there is a complete and/or significant soil exposure pathway, then complete PART III - Qualitative Summary and Certification. If the answer is No, go to Subpart B.

Subpart B. Affected Property Setting

In answering "Yes" to the following question, it is understood that the affected property is not attractive to wildlife or livestock, including threatened or endangered species (i.e., the affected property does not serve as valuable habitat, foraging area, or refuge for ecological communities). (May require consultation with wildlife management agencies.)

1) Is the affected property wholly contained within contiguous land characterized by: pavement, buildings, landscaped area, functioning cap, roadways, equipment storage area, manufacturing or process area, other surface cover or structure, or otherwise disturbed ground?

X Yes ☐ No

Explain:
The surface soil and any surface water has no detected concentrations of the cocs of the site. Only urban tolerant wildlife exist in the area and have no complete pathway to the contamination.

If the answer to Subpart B above is Yes, the affected property meets the exclusion criteria, assuming the answer to Subpart A was No. Skip Subparts C and D and complete PART III - Qualitative Summary and Certification. If the answer to Subpart B above is No, go to Subpart C.

Subpart C. Soil Exposure

1) Are COCs which are in the soil of the affected property solely below the first 5 feet beneath ground surface or does the affected property have a physical barrier present to prevent exposure of receptors to COCs in surface soil?

X Yes ☐ No

Explain: Only deep soil associated with monitoring well borings showed any signs of contamination. The soils were below 25 feet below ground level.

If the answer to Subpart C above is Yes, the affected property meets the exclusion criteria, assuming the answer to Subpart A was No. Skip Subpart D and complete PART III - Qualitative Summary and Certification. If the answer to Subpart C above is No, proceed to Subpart D.

Subpart D. *De Minimus* Land Area

In answering "Yes" to the question below, it is understood that all of the following conditions apply:

- The affected property is not known to serve as habitat, foraging area, or refuge to threatened/endangered or otherwise protected species. (Will likely require consultation with wildlife management agencies.)
- Similar but unimpacted habitat exists within a half-mile radius.
- The affected property is not known to be located within one-quarter mile of sensitive environmental areas (e.g., rookeries, wildlife management areas, preserves). (Will likely require consultation with wildlife management agencies.)
- There is no reason to suspect that the COCs associated with the affected property will migrate such that the affected property will become larger than one acre.

1) Using human health protective concentration levels as a basis to determine the extent of the COCs, does the affected property consist of one acre or less and does it meet all of the conditions above?

☐ Yes ☐ No

Explain how conditions are met/not met:

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Figure: 30 TAC §350.77(b) continued

If the answer to Subpart D above is Yes, then no further ecological evaluation is needed at this affected property, assuming the answer to Subpart A was No. Complete PART III - Qualitative Summary and Certification. If the answer to Subpart D above is No, proceed to Tier 2 or 3 or comparable ERA.

PART III. Qualitative Summary and Certification (Complete in all cases.)

Attach a brief statement (not to exceed 1 page) summarizing the information you have provided in this form. This summary should include sufficient information to verify that the affected property meets or does not meet the exclusion criteria. The person should make the initial decision regarding the need for further ecological evaluation (i.e., Tier 2 or 3) based upon the results of this checklist. After review, TNRCC will make a final determination on the need for further assessment. **Note that the person has the continuing obligation to re-enter the ERA process if changing circumstances result in the affected property not meeting the Tier 1 exclusion criteria.**

Completed by: Barry Lands ______________ *(Typed/Printed Name)*

Asst. Project Manager ______________ *(Title)*

4/7/04 ______________ *(Date)*

I believe that the information submitted is true, accurate, and complete, to the best of my knowledge.

Barry Lands ______________ *(Typed/Printed Name of Person)*

Asst. Project Manager ______________ *(Title of Person)*

______________ *(Signature of Person)*

4/7/04 ______________ *(Date Signed)*

Perry, Russell

From: Marilyn Long [MLONG@tceq.state.tx.us]
Sent: Friday, June 13, 2008 2:08 PM
To: Perry, Russell
Subject: Jones Road - Tier 1 Exclusion Criteria Checklist

Russell,

This email is in response to your inquiry about a question in the Tier 1 Exclusion Criteria Checklist that appears to be unanswered. I consulted with Mr. Lands and verified the answer to the following:

Subpart D. *De Minimus* Land Area

The answer to question 1) is: YES

This email may be attached to the Tier 1 Exclusion Criteria Checklist provided to Shaw.

Marilyn Czimer Long, P.G.
Texas Commission on Environmental Quality
MC-136
State Lead Section
(512) 239-0761
FAX (512) 239-2450
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